

Megabit Modem

MM701G User Manual

Version 1.x



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ABOUT THIS USER MANUAL

Use this manual to setup the MM701G modem. It provides instruction on:

- installing the modem
- configuring the modem
- monitoring the modem
- maintaining the modem

DOCUMENT CONVENTIONS



Notes contain information about special circumstances.



Cautions indicate the possibility of equipment damage or personal injury.

PRODUCT CERTIFICATIONS

FCC Class B Compliance

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

UL

This product meets all safety requirements per UL-1950 standard.

CE

This product meets all EMC and safety requirements per EN 300 386-2 and IEC 950 (EN60950).

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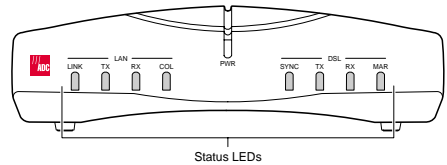
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OVERVIEW

1

The MM701G is a versatile, high-speed modem that extends your Ethernet LAN in a back-to-back implementation or connects your LAN to one or more service providers. It employs G.shdsl technology for fixed-rate or rate-adaptive, symmetric rates up to 2.3 Mbps over single-pair wiring and allows for multiple management options, including an easy to use Web-based interface. In addition, the MM701G supports 32 simultaneous Bridge/Router or PPP sessions to the same or different service providers over its G.shdsl WAN interface. For sizeable deployment, the MM701G provides the ability to download pre-defined configuration files to the flash memory instead of manually defining each and every value for all modems.



The MM701G also includes several useful protocols and services. If you require IP addresses to be served dynamically on your LAN, use the built-in DHCP server. If you need to update your modem software, use the built-in TFTP client. If you require private IP addresses and need to translate them into public IP addresses, use the built-in NAT function. If you need to exchange IP routing information with another device, configure and implement RIP. For a complete list of features, see [Appendix A](#).

Use this guide to install and configure your MM701G. Before installation, be sure to verify your shipping package contents and system requirements as described in the sections listed below.

Section	Page
Verify Shipping Package Contents	2
System Requirements	2
What To Do Next	2

VERIFY SHIPPING PACKAGE CONTENTS

As you unpack the modem, inspect the contents for damage. If the equipment was damaged in transit, report it to the shipping company and to your sales representative.

Check the contents of the package for the following:

- MM701G modem unit
- 6 Vdc power supply
- Ethernet cable
- phone cord with RJ-11 connectors
- console cable and DB-9 console port adapter

SYSTEM REQUIREMENTS

You need the following hardware and software to complete the installation and configuration of the MM701G:

- PC with an Ethernet NIC Card (10 Mbps Full Duplex) and serial port
- TCP/IP protocol stack installed (see your operating system documentation)
- Web browser installed such as Internet Explorer® Version 4.0 or higher
- Ethernet hub/switch (optional)
- Terminal emulation program (such as HyperTerminal)

WHAT TO DO NEXT

After you have verified the shipping package contents and system requirements, you are now ready to install the modem as explained in [Chapter 2 on page 3](#).

INSTALLING THE MODEM

2

Perform the following installation procedures to install the modem:

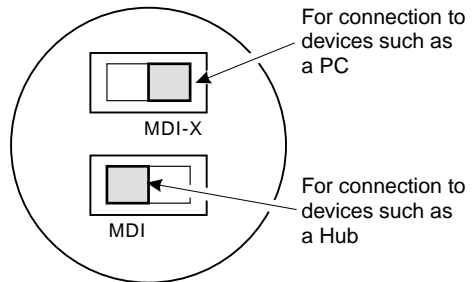
Section	Page
Setting the MDI/MDI-X Switch	4
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SETTING THE MDI/MDI-X SWITCH

The MDI/MDI-X switch located on modem rear panel allows you to connect a network device (such as a PC, hub, switch, or router) to the modem 10Base-T port.

Set the MDI/MDI-X switch for the 10Base-T port to:

- MDI-X when connecting to a network device such as a PC with an Ethernet NIC card with a MDI port
- MDI when connecting to a device such as a hub, switch, or router with a MDI-X port

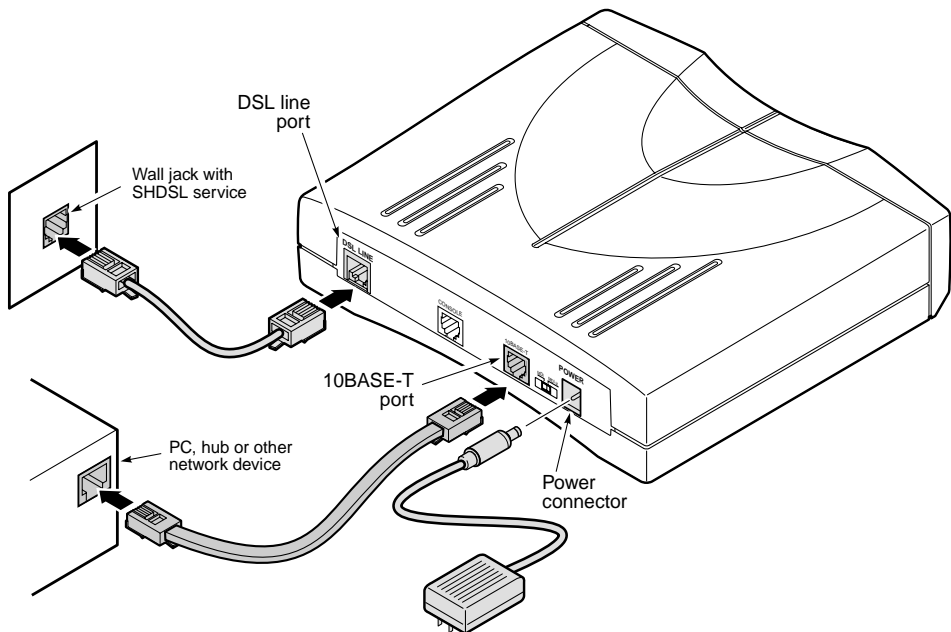


CONNECTING THE CABLES

After you've verified the shipping package contents, follow this procedure to physically set up your modem:

- 1 Turn off your computer.
- 2 Connect the cables to the modem rear panel as shown below.
 - grey phone cable for the DSL line port
 - black cable for the 10Base-T port
 - power cable for the modem Power connector

See “[Connecting to the Console Port](#)” on page 42 for connecting the console cabling.



CHECKING LED INDICATIONS

Your service provider sets up the G.shdsl parameters for your service. The MM701G must have the DSL SYNC LED lit before you can connect sessions with your service provider. Verify SYNC in the following table.

The table below describes LED indications for all operational modes. LEDs on the MM701G front panel provide continual status at-a-glance for network and voice connections.

LED	State	Description
POWER	On green	MM701G has power.
	Off	MM701G does not have power.
Ethernet		
LINK	On green	A PC, hub, or other network device is connected to the MM701G 10Base-T interface.
	Off	No device is connected to the MM701G 10Base-T interface.
Tx	Flashing green	MM701G is transmitting data to devices on the LAN.
	Off	MM701G is not transmitting data to the LAN.
Rx	Flashing green	MM701G is receiving data from devices on the LAN.
	Off	MM701G is not receiving data from the LAN.
Coll	Flashing green	Ethernet packet collisions are occurring on the LAN.
	Off	No Ethernet packet collisions are occurring.
DSL		
Sync	On green	DSL transceiver is synchronized (connected) and in normal operation mode.
	Flashing green	Slow flashing green indicates that the DSL transceiver is in a start-up or handshaking sequence. Fast flashing green indicates that the DSL transceiver is in training sequence.
	Off	DSL transceiver is not detecting a transceiver at the far end and is not connected.
Tx	Flashing green	MM701G is transmitting data over the DSL connection.
	Off	MM701G is not transmitting data over the DSL connection.
Rx	Flashing green	MM701G is receiving data over the DSL connection.
	Off	MM701G is not receiving data over the DSL connection.
Margin	On green	DSL margin is above the preset margin value.
	Off	DSL margin is at or below the preset margin value.

WHAT TO DO NEXT

After you have installed the modem, determine which method to use to manage the modem:

- For point-to-point applications, refer to [Chapter 5 on page 65](#).
- To manage the modem through the Web interface using your Web browser (recommended), refer to [Chapter 3 “Managing the Modem Using a Web Browser” on page 9](#).
- To manage the modem through the command-line interface using the modem console port or by a telnet session, refer to [Chapter 4 “Managing the Modem Using the Console Port & Telnet” on page 41](#).

MANAGING THE MODEM USING A WEB BROWSER

3

You can manage the MM701G using a Web browser, console port, or a telnet session.

All of the MM701G features and functionality are accessible through the Web interface. In contrast, there are some features not supported through the console port. For example, you can enable or disable spanning tree through the Web interface, but not through the console port or telnet. The same principle applies for deleting a WAN session and selecting ATM VBR as a quality of service.



To prevent losing your configuration changes, be sure to save them as described in “Saving Changes” on page 38.

Refer to the following sections to take advantage of the Web interface.

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Configuring the Web Browser	12
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Configuring the LAN	27
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SETTING UP THE PC

To access the modem Web interface, set up your PC on the same LAN IP subnet as the MM701G. The default LAN IP subnet for the modem is 10.0.0.0 with a subnet mask of 255.255.255.0.

However, if you have an existing subnet to accommodate the modem, change the IP address of the modem from the command-line interface as described in “[Setting Up the LAN](#)” on page 48.



If your PC cannot connect to the modem, set your PC Ethernet NIC card for 10 Mbps half-duplex transmission (not auto-detect).

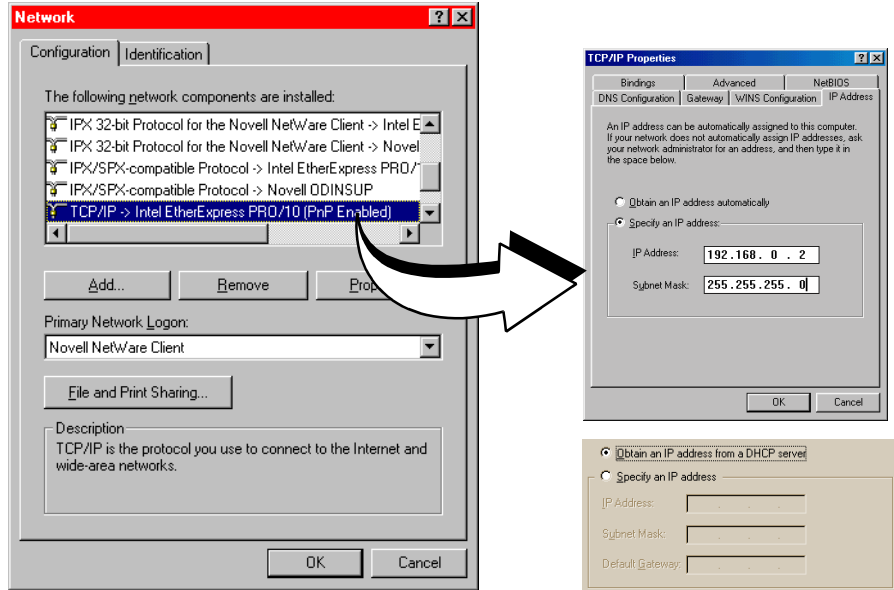
The following is an example of how to set up a PC running Microsoft Windows 98.

- 1 From the Windows desktop, click **Start, Settings, Control Panel** to open the **Control Panel** dialog.
- 2 From the **Control Panel** dialog, double-click the **Network** icon.
- 3 From the **Configuration** tab, double-click **TCP/IP**.



4 Do one of the following:

- If DHCP has not been enabled on the modem (default), select **Specify an IP address**.
- If DHCP has been enabled on the modem, select **Obtain an IP address automatically** and skip to step 6.



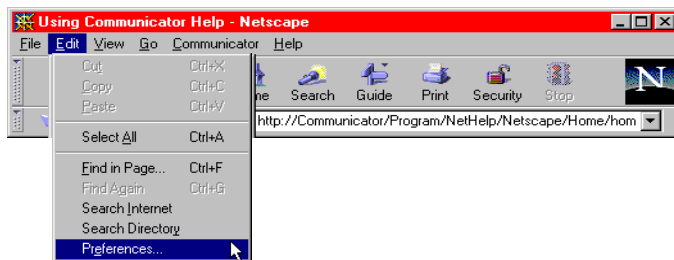
- 5 Enter **IP Address** and **Subnet Mask**. The default modem LAN IP address is 10.0.0.1 with a subnet mask of 255.255.255.0. Use an IP address for your PC from the following range: 10.0.0.2 to 10.0.0.254.
- 6 Click **OK** to close the **TCP/IP Properties** dialog.
- 7 Click **OK** to close the **Network** dialog.
- 8 Click **OK** to restart the computer.

CONFIGURING THE WEB BROWSER

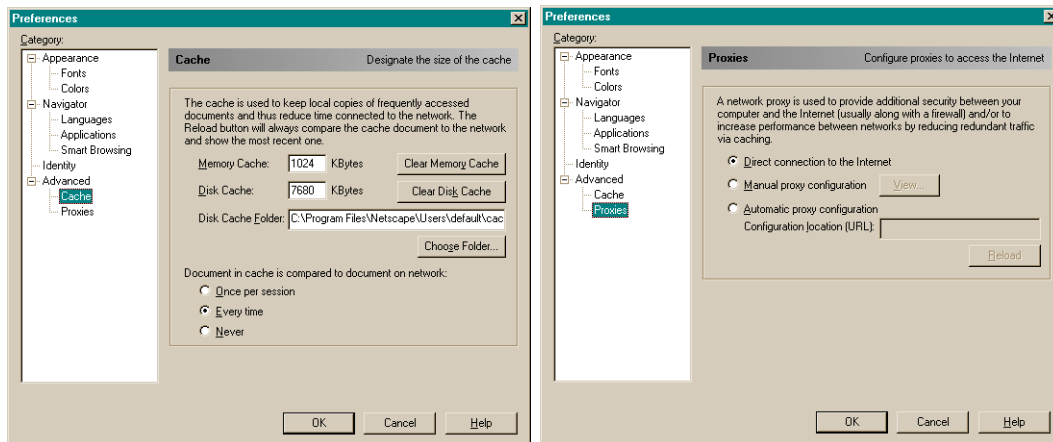
To view the modem Web pages properly, your Web browser must have the proxies disabled and cache settings enabled to compare the cached document against the network document every time it is accessed.

The following is an example of how to make the configuration changes using Netscape Navigator 4.0.

- 1 Open your Web browser.
- 2 Click **Edit, Preferences** to open the **Preferences** dialog.

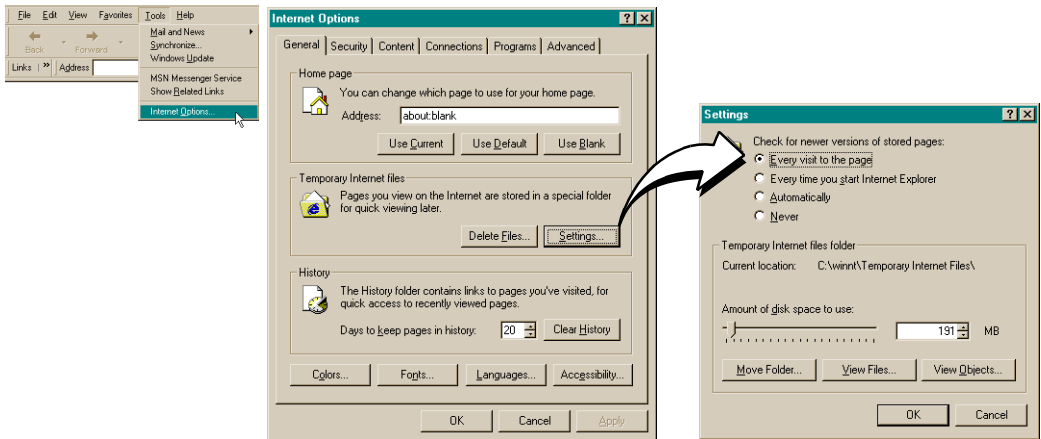


- 3 From Category, select **Advanced**, click **Cache**, then select **Every time** for **Document in cache is compared to document on network**.
- 4 From Category, select **Advanced**, click **Proxies**, then select **Direct connection to the Internet**.
- 5 Click **OK** to close the **Preferences** dialog.

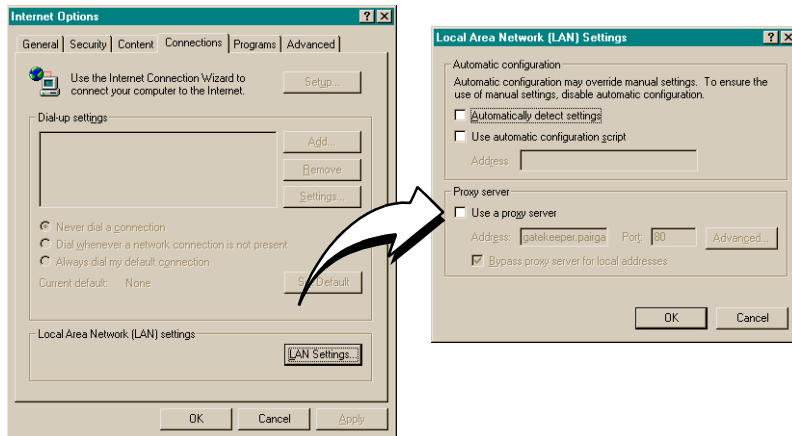


The following is an example of how to make the configuration changes using Internet Explorer 5.5:

- 1 Open your Web browser.
- 2 Click **Tools, Internet Options** to open the **Internet Options** dialog.
- 3 In the **Temporary Internet Files** section of the dialog, click **Settings**.
- 4 Select **Every visit to the page**, then click **OK**.

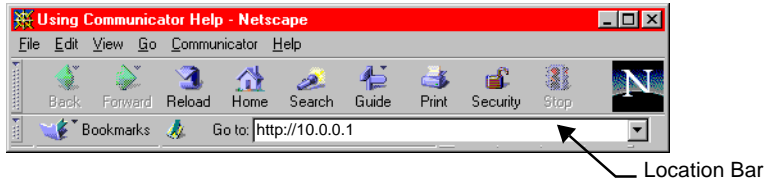


- 5 In the **Internet Options** dialog, click the **Connections** tab, then click **LAN Settings** to open the **LAN Settings** dialog.
- 6 In the **Proxy Server** section of the dialog, clear the **Use a proxy server** box.
- 7 Click **OK** to close the **LAN Settings** dialog.
- 8 Click **OK** to close the **Internet Options** dialog.

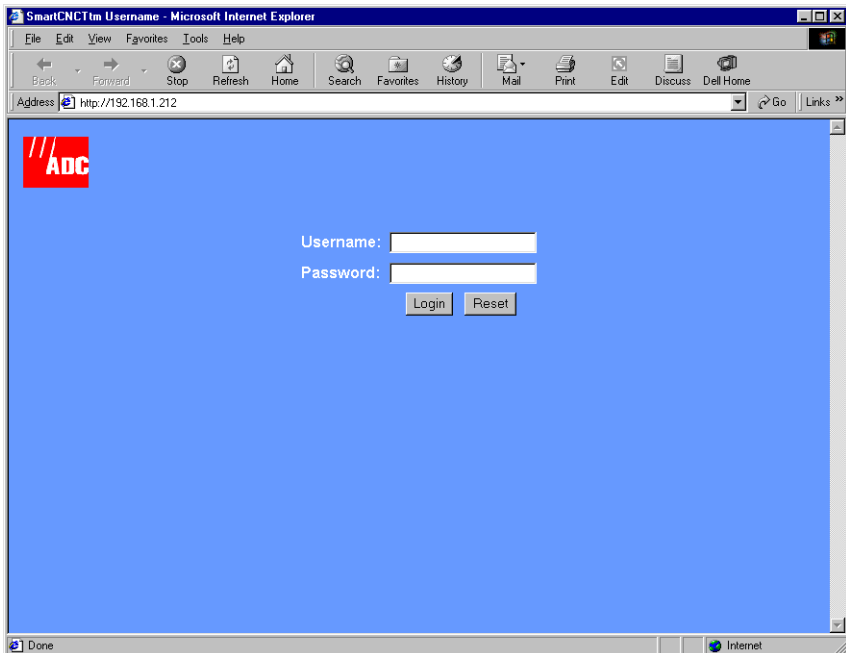


ACCESSING THE MODEM WEB PAGES

Type **http://10.0.0.1** in the Location Bar field of the Web browser (as shown below), then press **ENTER** to display the MM701G Web pages.



The following login screen displays.



This login is for the system administrator responsible for configuring and managing the MM701G. Enter the default username (**admin**) and password (**password**), then click **Login**. Or, if you have changed the login username and password, enter the new login username and password.

MANAGING THE SYSTEM

The System pages are designed so that you can manage, update, and troubleshoot the modem as a whole. From these pages you can:

- view the overall configuration of the modem
- enable or disable spanning tree
- change the login name and password
- update the modem software and configuration files
- revert back to the default factory values

View Modem Status

The **System Status** page is a read-only summary of the current modem configuration. It includes information about the modem software, DSL configuration values, WAN session settings, and LAN parameters. Use it as an overview of the modem status.



You cannot change the Device Name.

Device Name	Branch Router
Model	MM701G
DSP Version	R1.2-5
Firmware Revision	1.4.1

Summary of current settings:

DSL Status		WAN Session 1		LAN	
Modulation	G.shdsl-AnnexA	Protocol	RFC1483_Bridge	Protocol	Bridge
State	Handshaking	IP Address	N/A	IP Address	10.0.0.1
Data Rate TX	2320	Net Mask	N/A	Net Mask	255.255.255.0
Data Rate RX	2320	VPI	0	DHCP	N/A N/A
SNR Margin (dB)	43 dB	VCI	35	DNIS	N/A
		Session	Bridge		

To configure the DSL fields, see “DSL Advanced Configuration” on page 31.

Refer to the following table for a description of the fields:

Parameter	Description
Device Name	Descriptive role of the modem. This is not configurable.
Model	Megabit Modem model number.
DSP Version	Version of the Digital Signal Processor of the modem.
Firmware Revision	Version number of the image downloaded to the modem.
DSL Status Fields	Configuration values specific to G.shdsl.
Modulation	Annex standard (A or B) in the current configuration.
State	Status of the DSL link.
Data Rate TX	Rate at which the modem is configured to receive data.
Data Rate RX	Rate at which the modem is configured to send data.
SNR Margin (DB)	Used to control the front panel LED. See “DSL Advanced Configuration” on page 31 for more information.

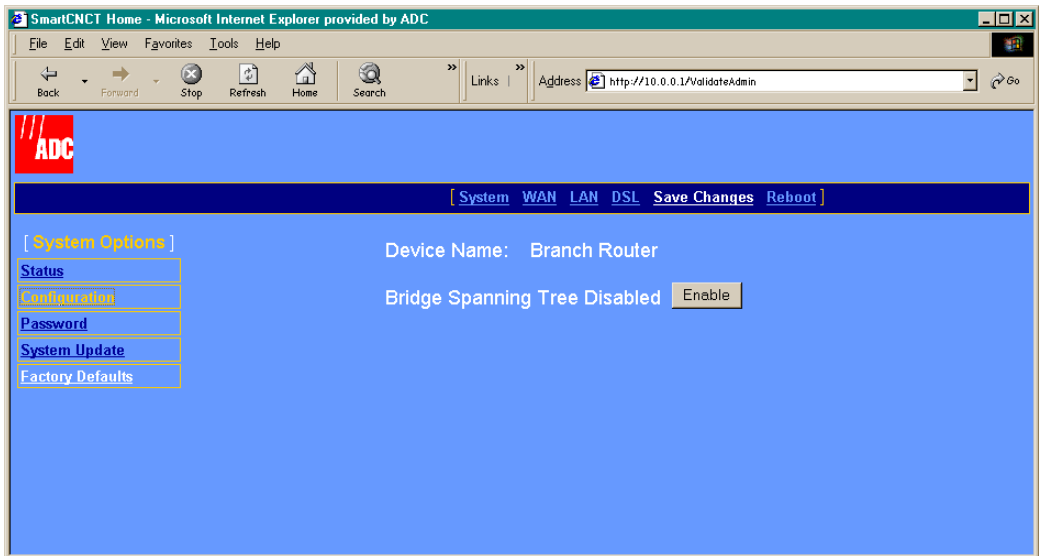
For WAN Session and LAN field descriptions, refer to

- [“Configuring the WAN” on page 23](#) for WAN Session fields.
- [“Configuring the LAN” on page 27](#) for LAN fields.

Set Spanning Tree

Spanning Tree eliminates loops in a LAN topology, ensuring that there is only one path (or link) between any two nodes on a network. Use Spanning Tree protocol only when you have already selected a Bridge session (as described in “Set Up WAN Sessions” on page 23) and when you have more than one device (a PC only) on your LAN and when those devices have more than one physical path connecting them.

- 1 Select **System** on the menu bar, then click **Configuration** to access the **System Configuration** page.

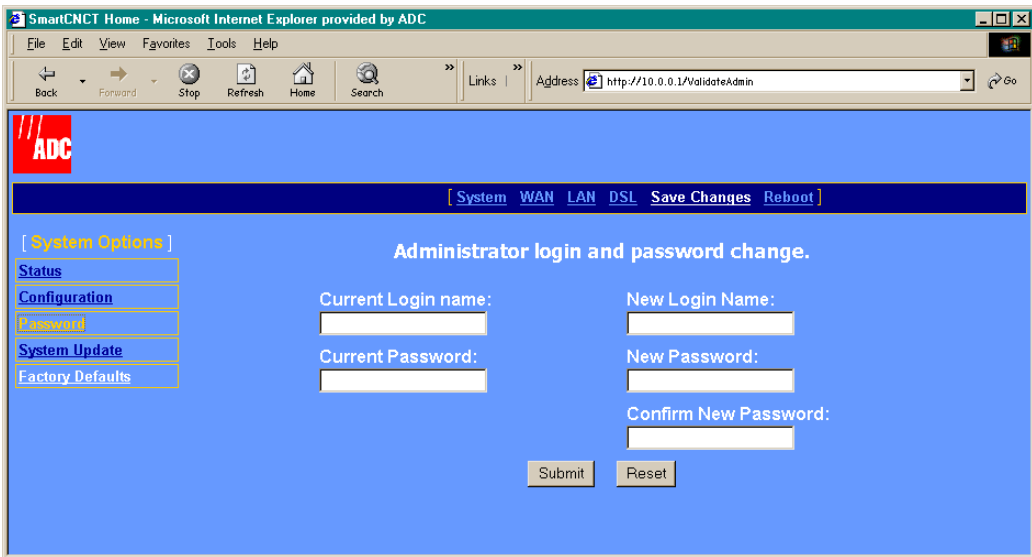


- 2 Select **Enable** to activate the Spanning Tree protocol for all bridging sessions.

Set Login Name and Password

You can change the login parameters for the system administrator. The default login name is **admin** and the default password is **password**.

- 1 Select **System** on the menu bar then click **Password** to access the **System Configuration** page.



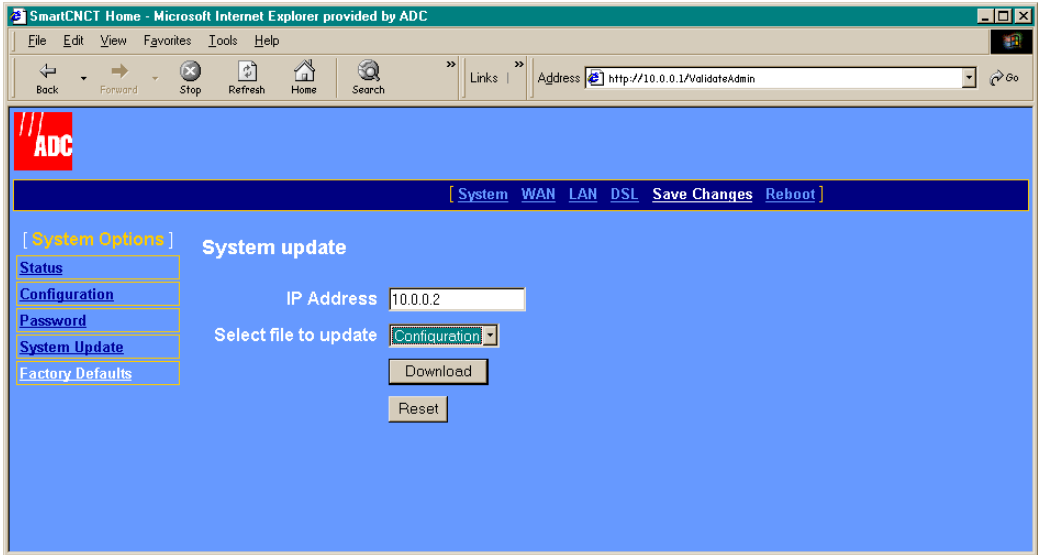
- 2 Enter the **Current Login name**, then enter the **Current Password**.
- 3 Enter the **New Login Name**, then enter the **New Password**.
- 4 Enter the new password again to **Confirm New Password**.
- 5 Click **Submit**.

Use the new Login Name and Password the next time you login to the MM701G.

Update System Software

You can upgrade the software on your MM701G. To upgrade, you must specify the IP address of the server where the new software is stored. The MM701G uses TFTP to download the software which comprises a configuration file (must be named “celsiancfg”) and an image file (must be named “image”).

- 1 Click **System** on the menu bar, then **System Update** to access the **System Update** page.



- 2 Enter the **IP Address** of the server where the firmware image or configuration file is located.
- 3 From **Select file to update**, do one of the following:
 - select **Configuration** to download the configuration file “celsiancfg”
 - select **Image** to download the image file “image”
- 4 Click **Download** to start the file download.

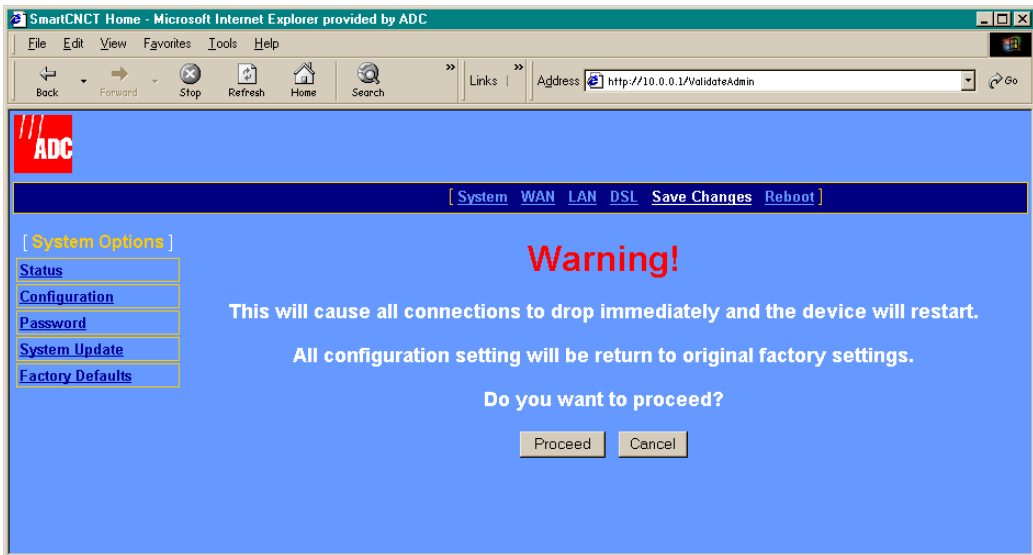
Set to Factory Defaults

When you configure the MM701G, you change the factory default settings to new values. You can return these parameters to their default values to provide a known starting point if you are troubleshooting or you simply want to configure new parameters. For session default values, see “Default Session Parameter Values” on page 82.



Active links are lost when you reset to factory default values.

- 1 Click **System** on the menu bar, then **Factory Defaults** to access the **System Factory Defaults** page.



- 2 Click **Proceed** if you want to return all values to their original factory values.
- 3 Click **Cancel** if you do not want to return all values to their original factory values.

CONFIGURING THE WAN

This configuration sets up the communication between the MM701G and the service provider for each session you set up. You can set up 32 separate sessions as RFC 1483 Bridge, RFC 1483 Router, or PPP protocol. Use the following sections to complete the WAN configuration.

Set Up WAN Sessions

- 1 Select **WAN** on the menu bar to access the Session configuration page.
- 2 Select a session from the **[Sessions]** list. The configuration options for that session appear in the **Session X** table (where X equals the Session number).

The screenshot shows a Microsoft Internet Explorer browser window displaying the SmartCNCNT Home web interface. The browser's address bar shows the URL `http://10.0.0.1/ValidateAdmin`. The page has a blue header with the ADC logo and a navigation menu containing [System](#), [WAN](#), [LAN](#), [DSL](#), [Save Changes](#), and [Reboot](#). Below the menu is a list of sessions under the heading **[Sessions]**, with links for Session 1 through Session 32. Session 2, [PoA-Router](#), is highlighted. To the right of the list is a configuration table for **Session 1**.

Session 1	
Session Name:	Bridge
Protocol	RFC1483 - Bridge
State	Enable
IP Address	N/A <input type="checkbox"/> Dynamic
Subnet Mask	N/A
NAT	Enable
RIP Send	None
RIP Accept	None
Virtual Path ID (VPI 0 - 4,095)	0
Virtual Channel ID (VCI 32 - 65,535)	35
ATM QoS	UBR
QoS Peak Cell Rate	
QoS Sustainable Cell Rate	
QoS Maximum Burst Size	
Encapsulation	LLC
Login Name (PPP session only)	N/A
Login Password (PPP sessions only)	***
Authentication	PAP

At the bottom of the configuration table are three buttons: **Apply**, **Reset**, and **Delete**.

- 3 Configure the following parameters for each session you set up as shown in the following table:

Parameter	Description
Session Name	Enter a unique, descriptive identifier for the session. This name can have a maximum of 15 characters with no spaces.
Protocol	<p>Select the message format to be used between the MM701G and the service provider. You can configure each session with any of the three protocols listed below.</p> <ul style="list-style-type: none"> • Select RFC 1483-Bridge if the MM701G forwards packets based on MAC addresses. You can enable Spanning Tree when you select Bridge sessions. See “Set Spanning Tree” on page 19. • Select RFC 1483-Router if the MM701G routes packets based on IP addresses. • Select PPPoA if the MM701G establishes PPP sessions with the service provider. <p>If you select RFC 1483 Bridge or RFC 1483 Router protocol, you only need to set up one session.</p> <p>You can, however, configure a combination of RFC 1483 Router/Bridge and PPP protocols for a multiple session configuration.</p>
State	Select Enable to activate this session. Select Disable to deactivate this session. You can set the state for each session. You can also change the state for a session at any time using this parameter.
IP Address	<p>Determine how an IP address is assigned to a session:</p> <ul style="list-style-type: none"> • If you selected PPPoA protocol, Dynamic is automatically selected. The service provider automatically assigns an IP address to this session. The IP address displays in the box. • If you selected RFC 1483-Router protocol, you enter the IP address supplied by the service provider in the box. Do not select Dynamic. • If you selected RFC 1483-Bridge protocol, you do not enter an IP address and you do not select Dynamic.
Subnet Mask	<p>Determine how the subnet mask is assigned to a session:</p> <ul style="list-style-type: none"> • If you selected PPPoA protocol, the service provider automatically assigns a Subnet Mask. The Subnet Mask displays in the box. • If you selected RFC 1483-Router protocol, you enter the Subnet Mask supplied by the service provider in the box. • If you selected RFC 1483-Bridge protocol, you do not enter a Subnet Mask.
NAT	Enable or Disable the use of Network Address Translation (NAT) protocol to translate private IP addresses (addresses on your LAN) to public IP addresses assigned to each session (see IP Address above in this table for session IP addresses).

Parameter	Description
RIP Send	<p>Routing Information Protocol (RIP) dynamically routes packets sent from the MM701G to the service provider. Select the same RIP version that is used by the service provider:</p> <ul style="list-style-type: none"> • Select Disable if you selected RFC1483 - Bridge protocol. • Select RIP1 to send broadcast packets from the MM701G. • Select RIP2 to send multicast packets from the MM701G. • Select RIP1&RIP2 to send both broadcast and multicast packets from the MM701G.
RIP Accept	<p>To dynamically route packets sent from the service provider to the MM701G, select the same RIP version that is used by the service provider:</p> <ul style="list-style-type: none"> • Select Disable if you chose RFC 1483 Bridge protocol. • Select RIP1 to receive broadcast packets. • Select RIP2 to receive multicast packets. • Select RIP1&RIP2 to receive both broadcast and multicast packets.
Virtual Path ID (VPI)	<p>Enter the value (from 0 to 4,095) provided by the service provider. The number identifies the virtual path that transports ATM cells between the MM701G and the service provider. This value must match the virtual path identification (VPI) the service provider uses for this connection.</p>
Virtual Channel ID (VCI)	<p>Enter the value (from 32 to 65,535) provided by the service provider. The number identifies the virtual channel for this session that transports ATM cells between the MM701G and the service provider. This value must match the virtual channel ID (VCI) that the service provider uses for this connection.</p>
ATM QoS	<p>Select the ATM Quality of Service supplied by your service provider. The options are:</p> <ul style="list-style-type: none"> • UBR (unspecified bit rate) • VBR-nrt (variable bit rate non-real-time) • CBR (constant bit rate)
QoS Peak Cell Rate	<p>Enter the QoS Peak Cell Rate (PCR) value supplied by your service provider A PCR value is required for CBR QoS, but is not used for UBR QoS. PCR is the maximum rate at which data is transferred on the line, measured in cells per second</p>
QoS Sustainable Cell Rate	<p>Enter the QoS Sustainable Cell Rate (SCR) value supplied by your service provider Use only for VBR-nrt QoS. SCR is the average rate at which ATM cells are transferred, measure in cells per second.</p>
QoS Maximum Burst Size	<p>Enter the QoS Maximum Burst Rate (MBR) value supplied by your service provider Use only for VBR-nrt QoS. MBR is the maximum number of cells that can be transmitted at the peak cell rate.</p>

Parameter	Description
Encapsulation	Select the encapsulation type that is supplied by the service provider. The options are: <ul style="list-style-type: none">• VC-MUX—Virtual Channel Multiplexer-based encapsulation, which allows one protocol to be run over the session.• LLC—Logical Link Control, which allows multiple protocols to be run over the session.
Login Name	A PPP session requires the Login Name supplied by the service provider.
Login Password	A PPP session requires the Login Password supplied by the service provider.
Authentication	Select the authentication protocol provided by your service provider for PPP sessions. The authentication protocol type must match at the MM701G and the service provider. The options are: <ul style="list-style-type: none">• PAP—The modem sends authentication requests to the service provider and authentication occurs only once during the life of the link.• CHAP—The service provider returns an authentication challenge to the modem during the authentication.

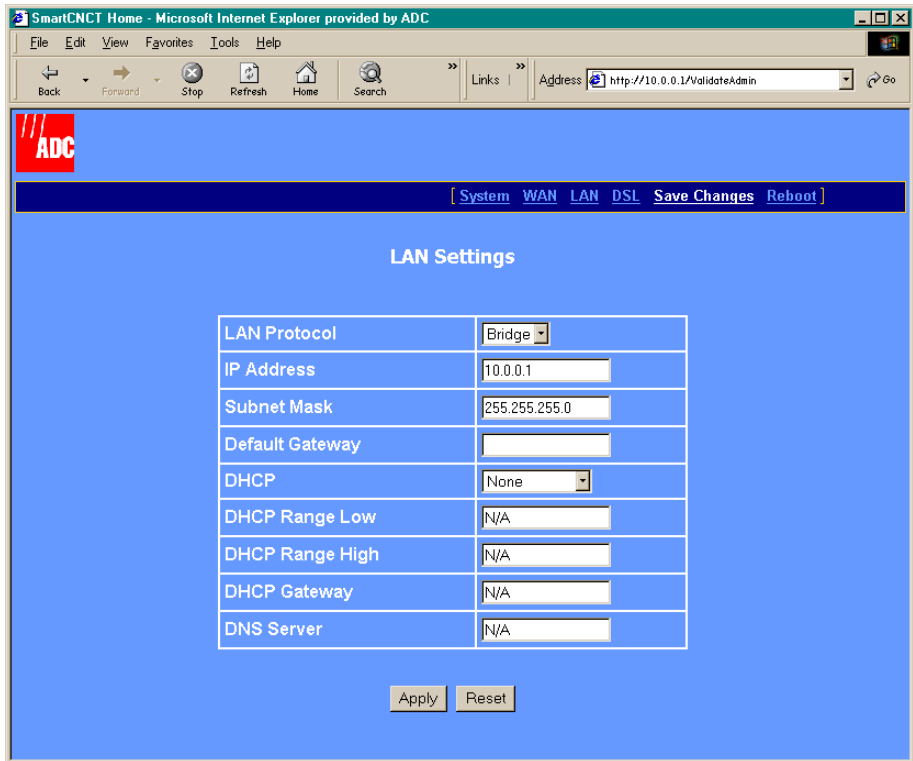
4 Do one of the following:

- Click **Apply**, then save changes as described in [“Saving Changes” on page 38](#).
- Click **Reset** to restart the session.
- Click **Delete** to remove the session, then save changes as described in [“Saving Changes” on page 38](#).
- Click **Save Changes** to save changes made to the configuration.

CONFIGURING THE LAN

This configuration sets up the communication between your LAN and the MM701G.

- 1 Select **LAN** on the menu bar to access the **LAN Settings** page.



The screenshot shows a Microsoft Internet Explorer browser window displaying the SmartCNET Home web interface. The address bar shows the URL `http://10.0.0.1/ValidateAdmin`. The interface has a blue background and a navigation menu at the top with options: [System](#), [WAN](#), [LAN](#), [DSL](#), [Save Changes](#), and [Reboot](#). The **LAN** option is selected. Below the menu, the page title is "LAN Settings". A table contains the following configuration fields:

LAN Protocol	Bridge
IP Address	10.0.0.1
Subnet Mask	255.255.255.0
Default Gateway	
DHCP	None
DHCP Range Low	N/A
DHCP Range High	N/A
DHCP Gateway	N/A
DNS Server	N/A

At the bottom of the form, there are two buttons: **Apply** and **Reset**.

2 Configure the following parameters:

Parameter	Description
LAN Protocol	<p>Select the message format to be used for your LAN.</p> <ul style="list-style-type: none"> • Select Bridge if the LAN forwards packets based on MAC addresses. If you selected RFC 1483 Bridge protocol for the WAN sessions (page 23), select Bridge for the LAN traffic. • Select Router if the LAN routes packets based on IP addresses. If you selected RFC 1483 Router or PPP protocol for the WAN sessions (page 23), select Router for the LAN traffic.
IP Address	<p>See your LAN administrator for LAN IP addresses.</p> <p>However, if you want to change the IP address through the Web interface, enter an IP address for the LAN (10Base-T) port provided by the LAN administrator. Or, you can use the default IP address for the LAN port which is 10.0.0.1. If you choose to use the default IP address, ensure that the devices on your LAN are on the same subnet as the MM701G LAN port.</p> <p>If you select Client for the DHCP configuration (below in this table), a DHCP server on your LAN automatically provides the IP address.</p>
Subnet Mask	<p>Enter the subnet mask for the LAN (10Base-T) port provided by the LAN administrator. Or, you can use the default subnet mask for the LAN port which is 255.255.255.0. If you choose to use the default subnet mask, ensure that it allows devices on your LAN to access the MM701G LAN port.</p>
Default Gateway	<p>Enter the default IP address for a default gateway that is supplied by the service provider.</p>
DHCP	<p>See your LAN administrator for the DHCP selection. You selected whether or not you wanted to enable DHCP in “Determining IP Addresses” on page 14.</p> <p>However, if you want to change that DHCP selection through the Web interface, select one of the following:</p> <ul style="list-style-type: none"> • None—DHCP is not enabled. • Client—The MM701G is a DHCP client and can be served an IP address for the LAN port by a DHCP server on your LAN. • Server—The MM701G is a DHCP server and can serve IP addresses to devices on your LAN. See DHCP Range Low and High for the ranges of IP addresses that the MM701G can serve.
DHCP Range Low	<p>Enter the IP address supplied by your LAN administrator. This is the lowest IP address value that the MM701G can serve when configured as a DHCP server.</p>
DHCP Range High	<p>Enter the IP address supplied by your LAN administrator. This is the highest IP address value that the MM701G can serve when configured as a DHCP server.</p>

Parameter	Description
DHCP Gateway	Enter the IP address of the default gateway that is provided by the LAN administrator for devices on the LAN. The MM701G must be configured as a DHCP server and provides this gateway IP address to requesting DHCP clients (such as PCs) on the LAN.
DNS Server	<p>Enter the IP address of the Domain Name System (DNS) server that is provided by either the service provider or the LAN administrator. The MM701G must be configured as a DHCP server and provides this DNS IP address to requesting DHCP clients (such as PCs) on the LAN.</p> <p>The DNS server maps human-readable addresses to IP addresses. A human-readable address is one such as:</p> <p style="padding-left: 40px;"><code>maggie.copro.company.com.</code></p> <p>The DNS resolver on the server translates this to a numeric value. This numeric value is the IP address assigned to a WAN session (see page 23).</p>

- 3 Do one of the following:
 - Click **Apply**, then save changes as described in “[Saving Changes](#)” on [page 38](#).
 - Click **Reset** to restart the session.
- 4 If you enabled DHCP, reboot the system as described in “[Rebooting the Modem](#)” on [page 39](#) to activate the DHCP parameters.

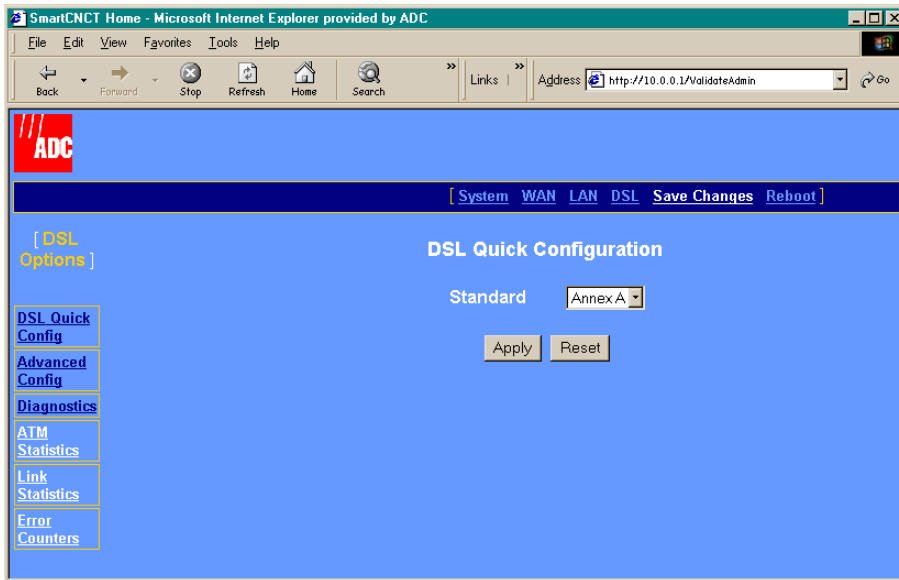
MANAGING DSL

Select either the DSL quick configuration or the advanced configuration as directed by your service provider.

DSL Quick Configuration

You can configure the MM701G to comply with different standards for DSL transmission. For the quick configuration, you only select the transmission type.

- 1 Select **DSL** on the menu bar then select **DSL Quick Config** under **[DSL Options]**.



- 2 Select one of the following options as directed by your service provider:
 - Annex A
 - Annex B
- 3 Click **Apply**.

DSL Advanced Configuration

You can configure the MM701G to comply with different standards for SHDSL transmission as well as parameters.

- 1 Select **DSL** on the menu bar, then select **DSL Advanced Config** under **[DSL Options]**.

The screenshot shows a web browser window with the title 'SmartCNCI Home - Microsoft Internet Explorer provided by ADC'. The address bar contains 'http://10.0.0.1/ValidateAdmin'. The main content area is blue and features a navigation menu at the top with links for 'System', 'WAN', 'LAN', 'DSL', 'Save Changes', and 'Reboot'. Below this, there is a sub-menu for '[DSL Options]' with links for 'DSL Quick Config', 'Advanced Config', 'Diagnostics', 'ATM Statistics', 'Link Statistics', and 'Error Counters'. The 'DSL Advanced Configuration' page is displayed, showing a table of parameters:

Exec Mode	CPE
Standard	Annex A
Startup Margin	2 DB
Power Backoff	Enable
Clock Offset (-100 - 100)	0 ppm
Upstream Frame Sync Word (0 - 65535)	13727
Upstream StuffBits (0 - 16)	15
Downstream Frame Sync Word (0 - 65535)	13727
Downstream StuffBits (0 - 16)	15
Encoder Coefficient A (0- 1048577)	366
Encoder Coefficient B (0- 1048577)	817
Minimum Base Rate (1 - 36)	1
Maximum Base Rate (1 - 36)	36
Minimum Sub Rate	0
Maximum Sub Rate	1
Wire Pair Mode	Single
Asymmetric PSD	Disabled
Bit Rate Mode	Adaptive Rate
Test Bit Rate	2320K
SNR Margin Limit (-64 - 63)	4

At the bottom of the configuration table, there are two buttons: 'Apply' and 'Reset'.

To view basic statistics for the DSL configuration, see “View Modem Status” on page 17.

2 Configure the following parameters as supplied by your service provider:

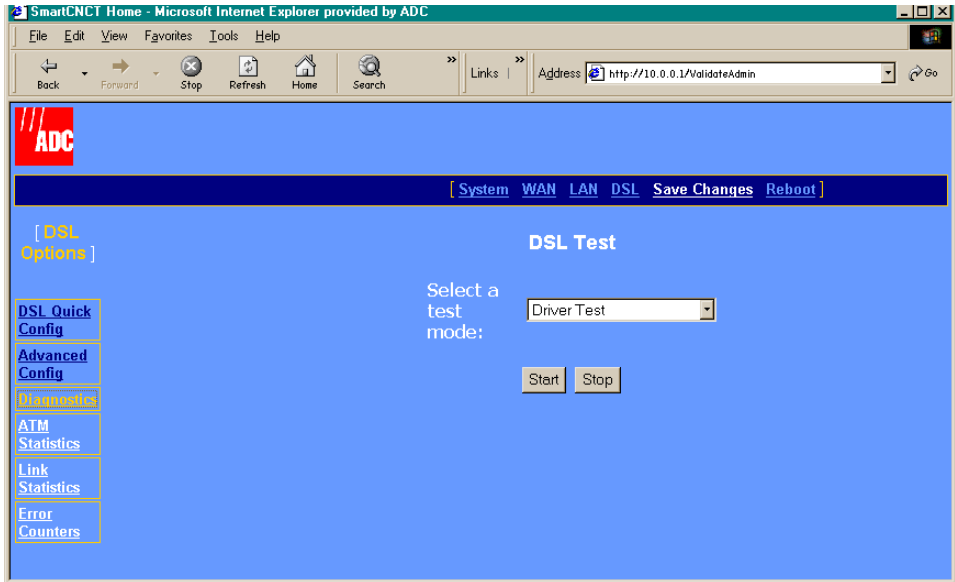
Parameter	Description
Exec Mode	Select CPE or CO. For point-to-point connections, one modem must be configured for CPE and the other for CO. For all other applications, select CPE.
Standard	Select Annex A or Annex B (Default: Annex A). Annex A and Annex B are both transmission standards. Annex A is most often used in North America. Annex B is most often used in Europe.
Startup Margin	Select a value from 2 DB to 15 DB. Applies only to Rate-Adaptive mode (Default: 2 DB).
Power Backoff	Select Enable or Disable (Default: Enable).
Clock Offset	Do not change from factory-ship configuration.
Upstream Frame Sync Word	Do not change from factory-ship configuration.
Upstream Stuffbits	Do not change from factory-ship configuration.
Downstream Frame Sync Word	Do not change from factory-ship configuration.
Downstream Stuffbits	Do not change from factory-ship configuration.
Encoder Coefficient A	Do not change from factory-ship configuration.
Encoder Coefficient B	Do not change from factory-ship configuration.
Minimum Base Rate	Enter a value from 1 to 36 to select the minimum acceptable data rate in Rate-Adaptive mode. Rate is equal to $N \times 64\text{kbps}$, where N is the selected value (Default: 1).
Maximum Base Rate	Enter a value from 1 to 36 to select the maximum acceptable data rate in Rate-Adaptive mode. Rate is equal to $N \times 64\text{kbps}$, where N is the selected value (Default: 36).
Minimum Sub Rate	Enter 0 or 1 (Default: 0).
Maximum Sub Rate	Enter 0 or 1 (Default: 1).
Wire Pair Mode	Select Single or Two (Default: Single).
Asymmetric PSD	Select Disabled, 1544 kb, or 784 kb (Default: Disabled).
Bit Rate Mode	Select Adaptive Rate or Fixed Rate (Default: Adaptive Rate).
Test Bit Rate	Select a value from 72K to 2368K (Default: 2320K).
SNR Margin Limit	Enter a value from -64 to 63. Used to control the front panel LED. (Default: 4).

3 Click **Apply**, then save changes using “Saving Changes” on page 38.

Test DSL

The MM701G has embedded diagnostics used for detecting line problems or as an aid in troubleshooting line related technical problems. These diagnostic programs have significance only to technical support personnel and is not discussed further in this manual.

- 1 Select **DSL** on the menu bar, then select **Diagnostics** to access the **DSL Diagnostics** page.

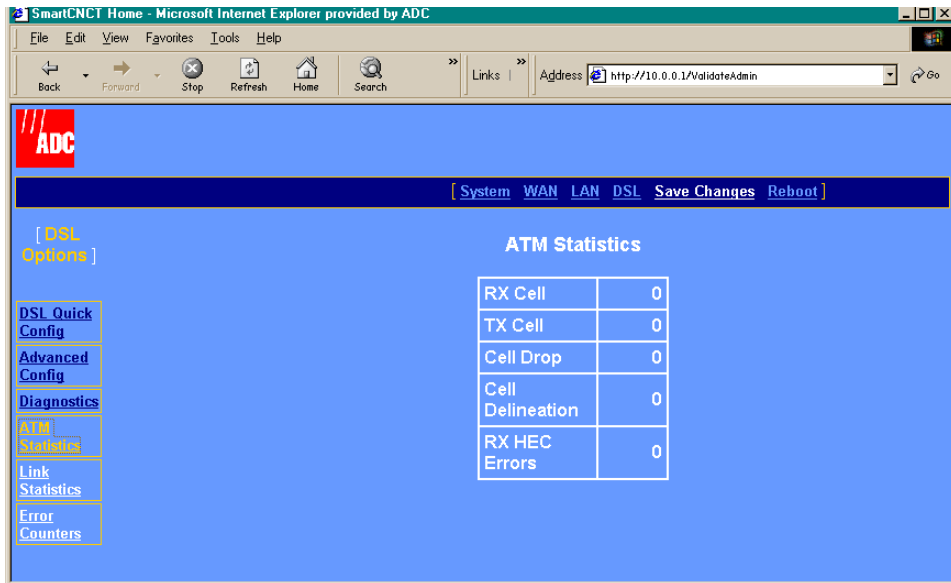


- 2 Select a test from the menu.
- 3 Do one of the following:
 - Click **Start** to begin the test.
 - Click **Stop** to terminate the test.

View ATM Statistics

Use the ATM statistics on the **DSL ATM Statistics** page for troubleshooting and monitoring ATM traffic.

- 1 Select **DSL** on the menu bar, then select **ATM Statistics** to access the **DSL ATM Statistics** page.



- 2 View the statistics.

Parameter	Description
RX Cell	The number of ATM cells received in the DSL interface.
TX Cell	The number of ATM cells transmitted from the DSL interface.
Cell Drop	The number of ATM cells dropped.
Cell Delineation	The real-time indicator of ATM cell delineation error (where 0 indicates no delineation errors and 1 for delineation errors).
RX HEC Errors	The number of ATM cells received with an error in the ATM cell header.

View Link Statistics

Use the ATM statistics on the **DSL Link Statistics** page for troubleshooting and monitoring ATM traffic.

- 1 Select **DSL** on the menu bar, then select **Link Statistics** to access the **DSL Link Statistics** page.

SmartCNET Home - Microsoft Internet Explorer provided by ADC

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Links Address http://10.0.0.1/ValidateAdmin Go

ADC

[System WAN LAN DSL Save Changes Reboot]

[DSL Options]

DSL Quick Config

Advanced Config

Diagnostics

ATM Statistics

Link Statistics

Error Counters

Link Statistics

Operational State	Handshaking
Data Rate	2320 Kbps
DSP Version	R1.2 -5
Last Failed	0x0000
Remote Coefficient A	0
Remote Coefficient B	0
Transmission Power	0
Receiver Gain	0
Local SNR Margin	43
Framer Sync	N/A

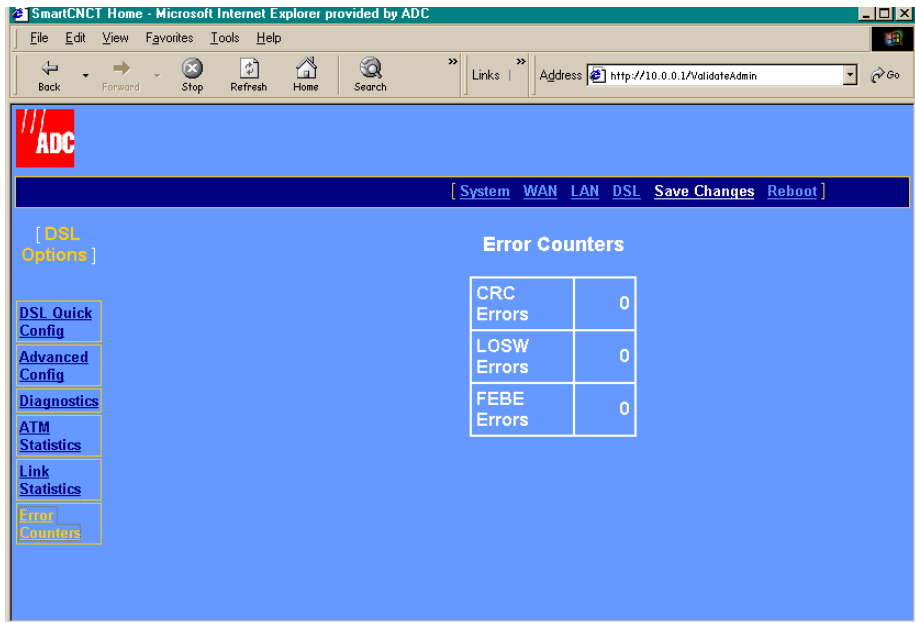
2 View the statistics.

Parameter	Description
Operational State	Valid entries are: <ul style="list-style-type: none"> • Handshaking is when the modem is making an attempt to connect to a device on the other side of the G.shdsl line. • Training is when the modem is learning the connection parameters. • Show Time is the actual connection time.
Data Rate	Bit rate after the ATM headers have been removed.
DSP Version	The modem DSP code can be upgraded—this is the current version that is running on your system.
Last Failed	Displays the last state reached before start-up failed. This is used for troubleshooting by technicians.
Remote Coefficient A	Displays the remote coefficient for channel A.
Remote Coefficient B	Displays the remote coefficient for channel B.
Transmission Power	Displays the local transmission power in dB.
Receiver Gain	Displays the amplifying factor for incoming signal in dB.
Local SNR Margin	Actual value of the current Signal to Noise (SNA) ratio.
Framer Sync	Displays the link status.

View Error Counters

Use the ATM statistics on the **DSL Error Counters** page for troubleshooting and monitoring ATM traffic.

- 1 Select **DSL** on the menu bar then select **Error Counters** to access the **DSL Error Counters** page.



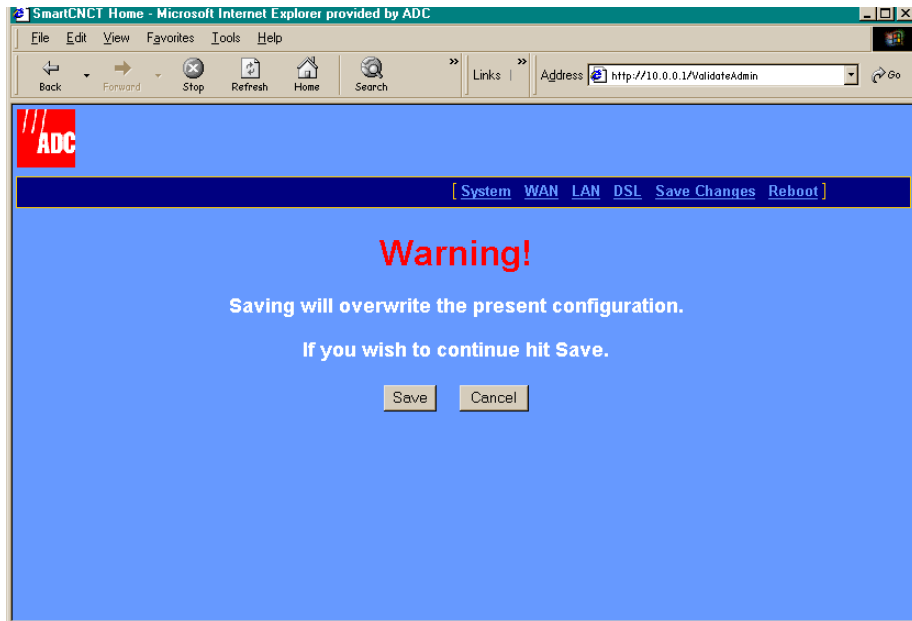
- 2 View the statistics.

Parameter	Description
CRC Errors	The number of cyclic redundancy check (CRC) errors. CRC is an error checking technique to ensure the integrity of data during transmission.
LOSW Errors	The number of errors due to a loss of signal.
FEBE Errors	The number of errors in forward and backward transmission.

SAVING CHANGES

Use the **Save Changes** page for saving your current configuration to flash memory. By saving your configuration changes, your changes will not be lost by resetting the modem.

- 1 Select **Save Changes** on the menu bar to access the **Save Changes** page.

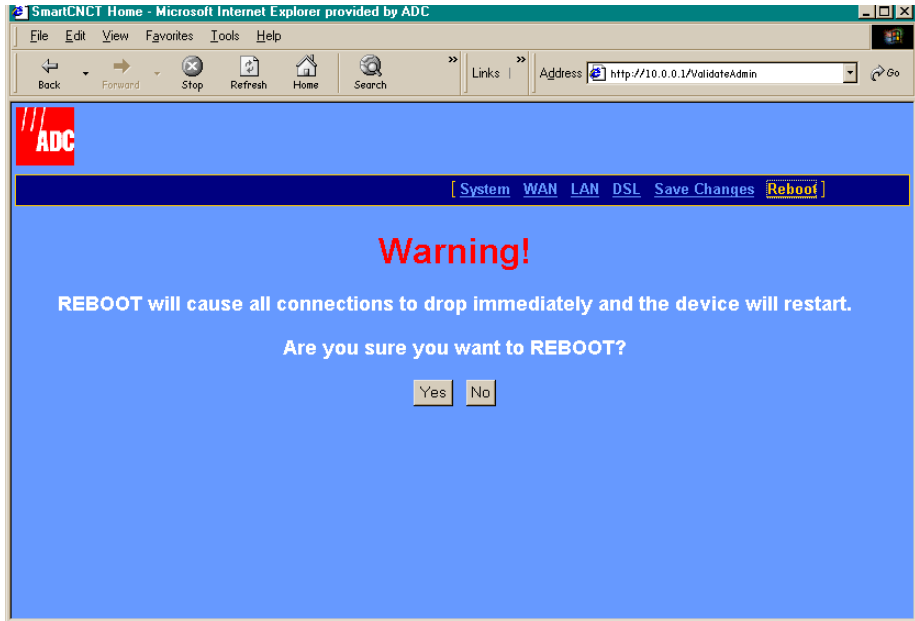


- 2 Do one of the following:
 - Click **Save** to write the configuration to flash memory.
 - Click **Cancel** to exit the current page without saving your configuration.

REBOOTING THE MODEM

Before you reboot the modem, make sure you have saved any configuration changes as described in “Saving Changes” on page 38.

- 1 Select **Reboot** on the menu bar to access the **Reboot** page.



- 2 Do one of the following:
 - Click **Yes** to reboot the modem.
 - Click **No** to cancel the rebooting process.

It is unlikely that the modem will lock up (no response to any of your requests through the Web interface and command-line interface). However, in this rare occurrence, power off the modem by disconnecting the power plug, wait 30 seconds, then reconnect the power. This process allows the modem to properly reset the power and eliminate the possibility of false values in memory. However, please note that the preferred method of rebooting is to access the Reboot page as described in the above procedure.

MANAGING THE MODEM USING THE CONSOLE PORT & TELNET

4

You can manage the MM701G using a Web browser, console port, and telnet session.

In comparison, you can manage more of the modem's functionality using a Web browser rather than using the modem console port and telnet access. For example, you can enable or disable spanning tree through the modem Web interface, but not through the console port or telnet. The same applies for deleting a WAN session and selecting ATM's VBR as a quality of service.

However, there are scenarios in which using the command-line interface is preferred over the Web interface. For example, if you cannot connect to the modem through the DSL line and 10Base-T port, you can still manage the modem through the console port.



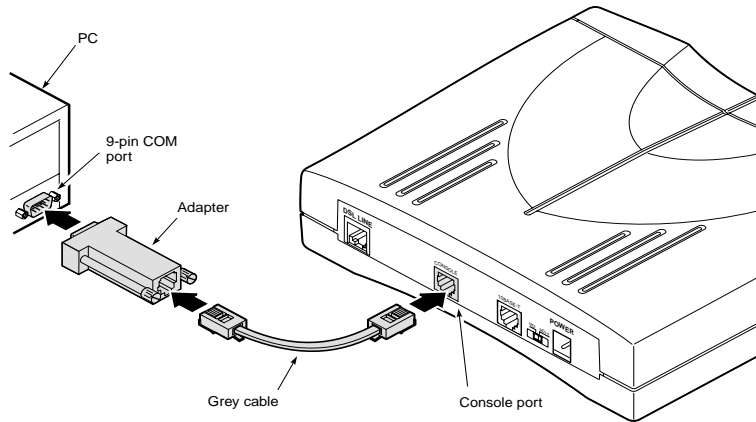
To prevent losing your configuration changes, be sure to save them as described in “Saving the Current Configuration” on page 60.

The following sections describe how to use the command-line interface:

Section	Page
Connecting to the Console Port	42
Setting Up a Telnet Session	44
Setting Up the WAN	45
Setting Up the LAN	48
Managing DSL	51
Restoring Factory Defaults	59
Saving the Current Configuration	60
Updating System Software	61
Viewing System Information	62
Rebooting the Modem	63

CONNECTING TO THE CONSOLE PORT

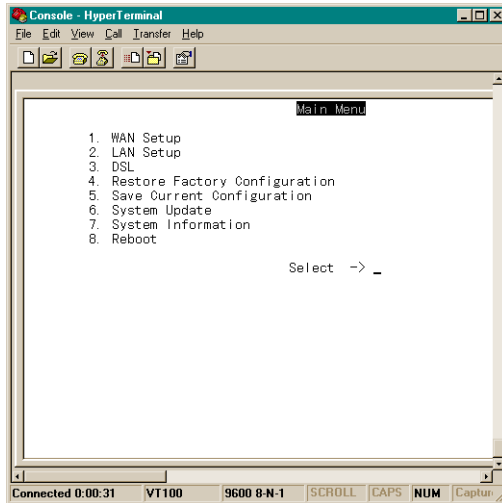
- 1 Install the supplied grey console cable between the modem Console port and your PC as shown below.



- 2 Using a terminal emulation program, verify the communication settings as follows:
 - 9600 baud
 - no parity
 - 8 data bits
 - no stop bit
 - flow control off

Currently, Windows includes a terminal emulation program called HyperTerminal. In Windows 98, access HyperTerminal from the Windows desktop by clicking **Start, Programs, Accessories, HyperTerminal**.

Once you have established communication, the **Main Menu** page displays.

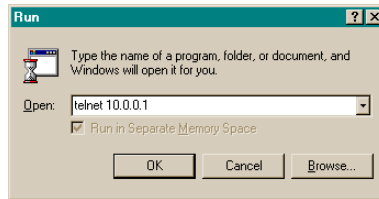


SETTING UP A TELNET SESSION

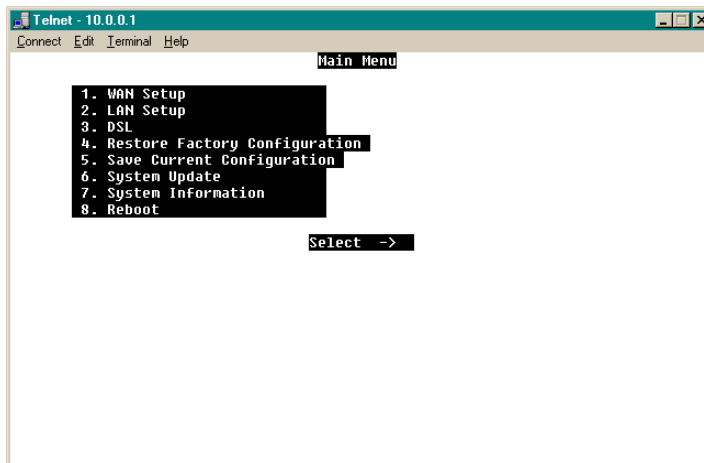
Use a telnet client to set up a telnet session to the modem. To set up a telnet session, specify the LAN IP address of the modem to establish communication. The default LAN IP address is 10.0.0.1. If this IP address has changed, contact your service provider.

Below is an example using Microsoft Windows 98:

- 1 Click **Start, Run** to access the **Run** dialog.



- 2 Enter the LAN IP address as a parameter to the telnet command, then click **OK** to start the Windows telnet client and access the password prompt.
- 3 Enter the telnet password to access the **Main Menu** page. The default telnet password for the MM701G is **password**.



SETTING UP THE WAN

For Bridge or Router mode you need to set the WAN VPI/VCI as supplied by your service provider.

- 1 From the **Main Menu**, select **WAN Setup**. The WAN Session screen displays.

```

Session group 1 - 16

 1. Session 1      Bridge      RFC1483 Bridge (Enabled)
 2. Session 2      IPoA-Router RFC1483 Router (Enabled)
 3. Session 3      PPP-Router  PPPoA          (Enabled)
 4. Session 4      UNDEFINED
 5. Session 5      UNDEFINED
 6. Session 6      UNDEFINED
 7. Session 7      UNDEFINED
 8. Session 8      UNDEFINED
 9. Session 9      UNDEFINED
10. Session 10     UNDEFINED
11. Session 11     UNDEFINED
12. Session 12     UNDEFINED
13. Session 13     UNDEFINED
14. Session 14     UNDEFINED
15. Session 15     UNDEFINED
16. Session 16     UNDEFINED
17. Get next group

      Select session for editing (Return to exit) ->

```

The WAN Session screen presents data related to each session defined for your Bridge/Router. The following table provides a description of the four fields displayed on the WAN Session screen.

Column	Description
1	The session number—sessions 1-16 are displayed on the first page of the screen and sessions 17-31 are displayed on a the second page of the WAN session screen. Example: <i>2. Session 2</i>
2	Session name—up to 15 characters may be entered for a descriptive name for a session. No spaces are allowed. Use this field to help identify each of your sessions. Example: <i>IPoA-Router</i>
3	Session protocol—configured for this session. Example: <i>RFCF1483 Router</i>
4	Session status indicator—enabled or disabled.

- 2 Select a session by typing the session number at the **Select session for editing prompt** to display the **WAN Session Options** screen.

```
Session Parameters
1. Session Name      Bridge          10. VPI           0
2. WAN Protocol     RFC1483 Bridge  11. VCI           35
3. State            Enabled         12. QOS           UBR
4. IP Addressing    N/A            13. QOS Peak Cell Rate
5. IP Address       N/A            14. Encapsulation LLC
6. IP Net Mask     N/A            15. Login Name    N/A
7. NAT             N/A            16. Login Password N/A
8. RIP Send        N/A            17. Authentication N/A
9. RIP Accept      N/A            18. Apply

Select parameter to edit (Return to exit) ->
```

- 3 Type **10** to select the VPI parameter, then enter the values supplied by your service provider.
- 4 Type **11** to select the VCI parameters, then enter the values supplied by your service provider.
- 5 If you are operating in Router mode, you also need to enter the WAN ADSL Port ID address and the associated WAN IP subnet mask. Both of these values are provided by your service provider.
- 6 Select **Apply** to activate your changes. **Apply** immediately activates the changes that you have made for this session.
- 7 Select **Save New System configuration** from the Main Menu as described in [“Saving the Current Configuration”](#) on page 60 or the changes will be lost upon reboot or power cycle.

Valid values for the parameters shown on the Sessions Options screen are defined in the following table. Unless there is a special circumstance, the default values for the remaining parameters should not be changed.

Session Parameter	Valid parameter Values
Session Name	The name assigned to the session by your service provider—up to 15 characters.
WAN Protocol	RFC1483-Router, RFC1483-Bridge, PPPoA.
State	Enable or Disable.
IP Addressing	Static or Dynamic.
IP Address	WAN IP address supplied by your service provider.
IP Net Mask	WAN IP subnet mask supplied by your service provider.
NAT	Enable or Disable.
RIP Send	Disable, RIP1, RIP2, Rip1&Rip2.
RIP Accept	Disable, RIP1, RIP2, Rip1&Rip2.
VPI	VPI supplied by your service provider.
VCI	VCI supplied by your service provider.
QoS	Supplied by your service provider.
QoS Peak Cell Rate	Supplied by your service provider.
Encapsulation	VC-MUX, LLC.
Login Name	PPP authentication name supplied by your service provider.
Login Password	PPP authentication password supplied by your service provider.
Authentication	PAP, CHAP.
Apply	Apply Settings.

SETTING UP THE LAN

If you are operating in Router mode and in a LAN environment, then you also need to set your LAN protocol, Ethernet Port IP address, and subnet mask.

If you prefer, you may use the default values of **10.0.0.1** for the Ethernet Port IP Address, and **255.255.255.0** for the subnet mask.

- 1 From the **Main Menu**, select **LAN Setup**. The LAN setup screen displays.

```
LAN
1. LAN Protocol          Bridge
2. IP address           10.0.0.1
3. IP Net Mask          255.255.255.0
4. Default Gateway
5. DHCP                None
6. DHCP Range Low Address N/A
7. DHCP Range High Address N/A
8. DHCP Gateway Address N/A
9. DHCP DNS            N/A
10. Apply

Select Parameter to edit (Return to exit) ->
```

- 2 Select **LAN Protocol** by typing **1** from the **LAN Setup** menu.
- 3 Do one of the following from the LAN Mode menu:
 - Select **Router** by typing **1**.
 - Select **Bridge** by typing **2**. You must configure an IP address for the LAN port to use a Browser or Telnet to manage the MM701G.
- 4 Select **IP Address** and **IP Net Mask** by typing **2** and **3** (respectively), then enter the values supplied by your LAN administrator or use the default values.
- 5 Select **Default Gateway** by typing **4** from **LAN Setup** menu, then enter the **Default Gateway IP** address supplied by your access provider.
- 6 Select **Apply** by typing **10** to activate your settings. **Apply** immediately activates the changes that you have made for this session.
- 7 From the **Main Menu** select **Save New System Configuration** to save these settings.

Valid values for the parameters shown on the LAN Setup screen are defined in the following table.

LAN Parameter	Valid parameter Values
LAN Protocol	Router or Bridge.
IP address	IP address assigned by your LAN administrator, or DHCP server (Default 10.0.0.1).
IP Net Mask	IP address assigned by your LAN administrator, or DHCP server (Default 255.255.255.0).
Default Gateway	Default Gateway provided by your access provider.
DHCP	Client, Server, or None.
DHCP Range Low Address	DHCP low range IP address supplied by your LAN administrator.
DHCP Range High Address	DHCP high range IP address supplied by your LAN administrator.
DHCP Gateway Address	In DHCP Server Mode, this is the gateway address that is automatically assigned to the requesting DHCP client.
DHCP DNS	In DHCP Server Mode, this is the DNS address that is automatically assigned to the requesting DHCP client.
Apply	Apply Settings.

Setting Up DHCP

This procedure is optional. Follow this procedure to enable or disable DHCP on the modem.

From the Main Menu, select **LAN Setup** screen and enter values for the following DHCP parameters:

- 1 To enable DHCP, select **DHCP** and choose either **Client** or **Server** by typing **2** or **3** on the LAN Setup menu. If **DHCP Client** is selected, you do not need to configure an IP address. **None** disables DHCP.
- 2 Enter the low range of the DHCP IP addresses as supplied by your LAN administrator.
- 3 Enter the high range of the DHCP IP addresses as supplied by your LAN administrator.
- 4 Enter the default gateway address that is provided to the requesting DHCP client—only if you are operating in server mode. This IP Address is also available from your LAN administrator.
- 5 Enter the DNS address that is provided to the requesting DHCP client—only if you are operating in server mode. This IP Address is also available from your LAN administrator.

- 6 Select **Apply** to immediately activate the changes that you have made for this session.
- 7 From the **Main Menu** select **Save New System Configuration** to save these settings or the changes will be lost upon reboot or power cycle.
- 8 If you have enabled DHCP, select **Reboot** from main menu to reboot the router.

Setting Up NAT

This procedure is optional. Follow this procedure to enable or disable NAT for a WAN session.

From the **Main Menu**, select **WAN Setup** to access the **WAN sessions** page.

- 1 Select the session for which you wish to enable NAT. The **WAN Sessions Options** screen displays.
- 2 From the **WAN Sessions Options** screen, select the NAT option and enter either **enable** or **disable** to change the NAT status for this session.

```
Session State
    1. Disable
    2. Enable

Select session NAT (Return to exit) ->
```

- 3 Select **Apply** to activate your changes. **Apply** immediately activates the changes that you have made for this session.
- 4 From the **Main Menu**, select **Save New System Configuration** to save these settings or the changes will be lost upon reboot or power cycle.
 - If DHCP Client is selected, you do not need to configure an IP address.
 - In Bridge mode, you need an IP address for the LAN port to use a Browser or Telnet to manage the MM701G.

MANAGING DSL

Use the **G.SHDSL** menu to manage the DSL line. This menu allows you to:

- view the DSL configuration
- configure the DSL line
- monitor the DSL statistics
- test the DSL line

```

G.SHDSL Menu

1. G.SHDSL Current Settings
2. Quick Configuration Setting
3. Advance Configuration Setting
4. G.SHDSL Statistics
5. Hardware/Line Diagnostics

Enter Selection (Return to exit) ->
```

Viewing the DSL Configuration

- 1 From the **Main Menu**, select **DSL** by typing **3** to access the **G.SHDSL Menu**.
- 2 From the **G.SHDSL Menu**, select **G.SHDSL Current Settings** by typing **1** to access the **G.SHDSL Current Setting** page.
- 3 View the DSL configuration as described by the table shown in [“Advanced Configuration”](#) on page 52.

Configuring the DSL Line

- 1 From the **Main Menu**, select **DSL** by typing **3** to access the **G.SHDSL Menu**.
- 2 From the **G.SHDSL Menu**, do one of the following:
 - To configure Annex A or Annex B as the standard, select **Quick Configuration Setting** and proceed to [“Quick Configuration”](#) on page 52.
 - To configure the advanced features of the modem, select **Advance Configuration Setting** and proceed to [“Advanced Configuration”](#) on page 52.

Quick Configuration

From the **SHDSL Standard** page, do one of the following:

- Select **G.SHDSL - Annex A**
- Select **G.SHDSL - Annex B**

Save your changes by selecting **Save Current Configuration** from the Main Menu as described in “Saving the Current Configuration” on page 60.

Advanced Configuration

From the **G.SHDSL Advance Configuration Setting** page, type the number of the G.shdsl field to configure, then reference the table below for assistance in changing and selecting the parameter value.

```
G.shdsl Advance Configuration Setting
1. ExecMode           CPE           12. MinBaseRate      1
2. Standard           G.shdsl-AnnexB 13. MaxBaseRate     36
3. StartupMargin      2dB           14. MinSubRate      0
4. ClockOffset (ppm)  0             15. MaxSubRate      1
5. PowerBackoff       Enable        16. WirePairMode    SinglePair
6. UpFrameSync        13727        17. AsymmetricPSD  SymmetricPSD
7. UpStuffBits        15           18. BitRateMode     AdaptiveRate
8. DownFrameSync      13727        19. TestBitRate     2320K
9. DownStuffBits      15           20. SNRMarginLimit (dB) 4
10. EncoderCoeffA     366          21. Apply
11. EncoderCoeffB     817
```

Enter Parameter to edit (Return to exit) ->

SHDSL Parameter	Description	Values
ExecMode	Operational mode of the modem. If you are implementing a back-to-back configuration, configure one modem in CO mode and the other in CPE mode. Otherwise, select CPE.	CPE, CO
Standard	Select Annex A or Annex B (Default: Annex A).	Annex A, Annex B
StartupMargin	Currently only 0 dB is supported.	2 to 15
ClockOffset	Used for a low frequency wander and jitter between network and DSL system clock. Only set on the CO side. (Default: 0)	-100 to 100 ppm
PowerBackoff	Select Enable to activate Power Backoff or Disable to deactivate Power Backoff. (Default: Enable)	Enable, Disable

SHDSL Parameter	Description	Values
UpFrameSync	The Upstream Frame Sync Word parameter. (Default: 13727)	0 to 65535
UpStuffBits	The Upstream Stuffbits parameter. (Default: 15)	0 to 16
DownFrameSync	The Downstream Frame Sync Word parameter. (Default: 13727)	0 to 65535
DownStuffBits	The Downstream Stuffbits parameter. (Default: 15)	0 to 16
Encoder CoeffA	The encoder coefficient for the A channel. (Default: 366)	0 to 1048577
Encoder CoeffB	The encoder coefficient for the B channel. (Default: 817)	0 to 1048577
MinBaseRate	Used with the MinSubRate to define the minimum line rate. (Default: 1)	
MaxBaseRate	Used with the MaxSubRate to define the maximum line rate. (Default: 36)	1 to 36
MinSubRate	Used with the MinBaseRate to define the minimum line rate. (Default: 0)	0,1
MaxSubRate	Used with the MaxBaseRate to define the maximum line rate. (Default: 1)	0,1
WirePairMode	Currently only SinglePair is supported.	SinglePair, TwoPair
AsymmetricPSD	Select between the three options: Symmetric PSD, AsymPSDHighRate, AsymPSDLowRate. (Default: SymmetricPSD)	SymmetricPSD, AsymPSDHighRate, AsymPSDLowRate
BitRateMode	The method in which the modem establishes a bit rate with the device on the other side of the DSL line (such as the DSLAM or another MM701G). Fixed Rate attempts to establish a connection only at the rate that is specified while Adaptive Rate dynamically negotiates its bit rate. (Default: Adaptive Rate)	Fixed Rate, Adaptive Rate
TestBitRate	Select a value from 72K to 2320K. (Default: 2320)	72K to 2320K
SNRMarginLimit	The signal-to-noise ratio limit. This can be set between -64 to +63. The Margin LED on the front panel indicates when the actual SNR is greater than the configured value. (Default: 4)	-64 to 63

Monitoring the DSL Statistics

Use the **G.SHDSL Statistics** page to monitor the following types of DSL statistics:

- General Statistics
- Error Counters
- ATM Counters

Viewing General Statistics

- 1 From the **Main Menu**, select **DSL** by typing **3** to access the **G.SHDSL Menu**.
- 2 Select **G.SHDSL Statistics** by typing **4** to access the **G.SHDSL Statistics** page.
- 3 Select **G.SHDSL General Statistics** by typing **1** to access the **G.SHDSL General Statistics** page.

```
G.SHDSL General Statistics

1. OperationalState      Handshaking
2. DataRate (Kbps)      2320
3. DSPVersion            R1.2 -5
4. LastFailed            0x0000
5. RemoteEncoderCoeffA  0
6. RemoteEncoderCoeffB  0
7. TransmissionPower    0
8. ReceiverGain         0
9. LocalSNRMargin       43
10. LoopAttenuation     0
11. Framersync          N/A

Press any key (Return to exit) -->
```

4 View the statistics.

Parameter	Description
OperationalState	Valid entries are: <ul style="list-style-type: none"> • Handshaking is when the modem is making an attempt to connect to a device on the other side of the G.shdsl line. • Training is when the modem is learning the connection parameters. • Show Time is the actual connection time.
DataRate	Bit rate after the ATM headers have been removed.
DSPVersion	The modem DSP code can be upgraded—this is the current version that is running on your system.
LastFailed	Displays the last state reached before start-up failed. This is used for troubleshooting by technicians.
RemoteEncoderCoeffA	Displays the remote coefficient for channel A.
RemoteEncoderCoeffB	Displays the remote coefficient for channel B.
TransmissionPower	Displays the local transmission power in dB.
ReceiverGain	Displays the amplifying factor for incoming signal in dB.
Local SNRMargin	Actual value of the current Signal to Noise (SNA) ratio.
FramerSync	Displays the link status.

Viewing Error Counters

- 1 From the **Main Menu**, select **DSL** to access the **G.SHDSL Menu**.
- 2 Select **G.SHDSL Statistics** to access the **G.SHDSL Statistics** page.
- 3 Select **G.SHDSL Error Counters** to access the **G.SHDSL Error Counters** page.

```

G.SHDSL Error Counters

1. CRCErrors           0
2. LOSWErrors         0
3. FEBEErrors         0

Press any key (Return to exit) ->
```

- 4 View the counters.

Parameter	Description
CRCErrors	The number of cyclic redundancy check (CRC) errors. CRC is an error checking technique to ensure the integrity of data during transmission.
LOSWErrors	The number of errors due to a loss of signal.
FEBEErrors	The number of errors in forward and backward transmission.

Viewing ATM Counters

- 1 From the **Main Menu**, select **DSL** to access the **G.SHDSL Menu**.
- 2 Select **G.SHDSL Statistics** to access the **G.SHDSL Statistics** page.
- 3 Select **G.SHDSL ATM Counters** to access the **G.SHDSL ATM Counters** page.

```

ATM Counters

1. RxCell              0
2. TxCell              0
3. CellDrop            0
4. CellDelineation    0
5. RxHECErrors        0

Press any key (Return to exit) ->
```

4 View the statistics.

Parameter	Description
RXCell	The number of ATM cells received in the DSL interface.
TXCell	The number of ATM cells transmitted out the DSL interface.
CellDrop	The number of ATM cells dropped.
CellDelineation	The bit indicating the presence of cell delineation errors. <ul style="list-style-type: none">• 0 for delineation errors• 1 for no delineation errors.
RxHECErrors	The number of ATM cells received in error.

Testing the DSL Line

The MM701G has embedded diagnostics used for detecting line problems or as an aid in troubleshooting line related technical problems. These programs are used by technical support personnel to diagnose problems and determine the appropriate solutions.

- 1 From the **Main Menu**, select **DSL** to access the **G.SHDSL Menu**.
- 2 Select **Hardware/Line Diagnostics** to access the **G.SHDSL Hardware/Line Diagnostics** page.
- 3 Select a diagnostic. These diagnostic programs have significance only to technical support personnel and are not discussed further in this manual.

RESTORING FACTORY DEFAULTS

When you configure the MM701G, you change the factory default settings to new values. You can return these parameters to their default values to provide a known starting point if you are troubleshooting or you simply want to configure new parameters.



Active links may be lost when you reset to factory default values.

- 1 From the **Main Menu**, select **Restore Factory Configuration** to access the **Restore Factory Configuration** page.

```
WARNING - This will delete configuration and return to default
1. Continue
2. Cancel

Select (Return to exit) ->
```

- 2 Do one of the following:
 - Select **Continue** if you want to return all values to their original factory values.
 - Select **Cancel** if you do not want to return all values to their original factory values.

If you restore the factory defaults, save the changes by selecting **Save Current Configuration** from the Main Menu as described in [“Saving the Current Configuration”](#) on page 60.

SAVING THE CURRENT CONFIGURATION

Use the **Save Current Configuration** page for saving your current configuration to flash memory. By saving your configuration changes, your changes will not be lost by resetting the modem.

- 1 From the **Main Menu**, select **Save Current Configuration** to access the **Save Current Configuration** page.

```
WARNING - This will overwrite configuration
```

- ```
1. Continue
2. Cancel
```

```
Select (Return to exit) ->
```

- 2 Do one of the following:
  - Select **Continue** to write the configuration to flash memory.
  - Select **Cancel** to exit the current page without saving your configuration.

## UPDATING SYSTEM SOFTWARE

You can upgrade the firmware on your MM701G. To upgrade, you must specify the IP address of the server where the new firmware is stored.

- 1 Configure a TFTP server to download the system software. The MM701G uses TFTP to download the firmware which comprises a configuration file (must be named “celsiancfg”) and an image file (must be named “image”) located on the TFTP server.
- 2 From the **Main Menu**, select **System Update** to access the **System Update** page.

```
System Update
1. IP Address 10.0.0.2
2. File to update CONFIGURATION
3. Update

Select (Return to exit) ->
```

- 3 Select **IP Address** to configure the IP address of the TFTP server to download the system software.
- 4 Select **File to update** to determine the type of file to download.
- 5 At the **Update File** menu, select one of the following:
  - **Configuration** to download the configuration file “celsiancfg”
  - **Image** to download the image file “image”
- 6 Select **Update** to begin updating the software.

## VIEWING SYSTEM INFORMATION

The System Information page is a read-only summary of the current modem configuration. It includes information about the firmware release, model, release date, MAC address, and DSP version. This information is often used by technical support when troubleshooting.

- 1 From the **Main Menu**, select **System Information** to access the **System Information** page.

```
System Information
1. Firmware Release 1.4.1
2. Model MM701G
3. Release date May 24 2001
4. MAC address 00:20:A7:A2:01:C0
5. DSP version R1.2 -5

Press any key (Return to exit) ->
```

- 2 View the information.

## REBOOTING THE MODEM

Before you reboot the modem, save configuration changes as described in “[Saving the Current Configuration](#)” on page 60.

- 1 From the **Main Menu**, select **Reboot** to access the **Reboot** page.

```
WARNING - This will reboot without saving configuration
1. Continue
2. Cancel

Select (Return to exit) ->
```

- 2 Do one of the following:
  - Select **Continue** to reboot the modem.
  - Select **Cancel** to cancel the rebooting process.

It is unlikely that the modem will lock up (no response to any of your requests through the Web interface and command-line interface). In this rare occurrence, power off the modem by disconnecting the power plug, wait 30 seconds, then reconnect the power. This process allows the modem to properly reset the power and eliminate the possibility of false values in memory. However, please note that the preferred method of rebooting is to access the **Reboot** page as described in the above procedure.



# IMPLEMENTING POINT-TO-POINT LAN EXTENSION

---

# 5

With a pair of MM701Gs, you can connect remote LANs by placing them “back-to-back.” One MM701G is set for Customer Premise Equipment (CPE) mode and the other MM701G is set for Central Office (CO) mode. By bridging traffic between these two modems you essentially create one extended LAN that allows the use of a single IP subnet.

Straight out of its shipping box, the CPE modem is already configured for implementing point-to-point LAN extension. There are no changes necessary for this modem. Furthermore, there are only two configuration changes necessary for the CO modem:

- set it up for CO mode
- change the LAN IP address

These changes are described in “[Quick Installation](#)” on page 66.

However, if you already have a custom configuration (not using factory defaults) on your modems, refer to “[Configuring the CPE Modem](#)” on page 68 to configure the CPE modem and “[Configuring the CO Modem](#)” on page 72 to configure the CO modem.

| <b>Section</b>                            | <b>Page</b> |
|-------------------------------------------|-------------|
| <a href="#">Quick Installation</a>        | 66          |
| <a href="#">Configuring the CPE Modem</a> | 68          |
| <a href="#">Configuring the CO Modem</a>  | 72          |
| <a href="#">Verifying Connectivity</a>    | 76          |

# QUICK INSTALLATION



The MM701G is shipped with factory defaults as a CPE and does not require any additional configuration to fill the role of the CPE modem. Only the CO modem requires configuration.

To set up the CO modem, follow these instructions:

## Configure for CO Mode

- 1 Select **DSL** on the menu bar, then select **DSL Advanced Config** under **[DSL Options]**.

The screenshot shows a web browser window titled "SmartCNET Home - Microsoft Internet Explorer" with the address bar showing "http://192.0.0.1/ModemAdmin". The page has a blue background and a navigation bar with links: [ System WAN LAN DSL Save Changes Reboot ]. Below the navigation bar, there is a section for "[ DSL Options ]" with a list of links: DSL Quick Config, Advanced Config, Diagnostics, ATM Statistics, Link Statistics, Error Counters. The main content area is titled "DSL Advanced Configuration" and contains a table of configuration parameters:

|                                        |               |
|----------------------------------------|---------------|
| Exec Mode                              | CO            |
| Standard                               | Annex A       |
| Startup Margin                         | 2 DB          |
| Power Backoff                          | Enable        |
| Clock Offset (-100 - 100)              | 0 ppm         |
| Upstream Frame Sync Word (0 - 65536)   | 13727         |
| Upstream StuffBits (0 - 16)            | 15            |
| Downstream Frame Sync Word (0 - 65536) | 13727         |
| Downstream StuffBits (0 - 16)          | 15            |
| Encoder Coefficient A (0 - 1048577)    | 366           |
| Encoder Coefficient B (0 - 1048577)    | 817           |
| Minimum Base Rate (1 - 36)             | 1             |
| Maximum Base Rate (1 - 36)             | 36            |
| Minimum Sub Rate                       | 0             |
| Maximum Sub Rate                       | 1             |
| Wire Pair Mode                         | Single        |
| Asymmetric PSD                         | Disabled      |
| Bit Rate Mode                          | Adaptive Rate |
| Test Bit Rate                          | 2320K         |
| SNR Margin Limit (-64 - 63)            | 4             |

At the bottom of the configuration table, there are two buttons: "Apply" and "Reset".

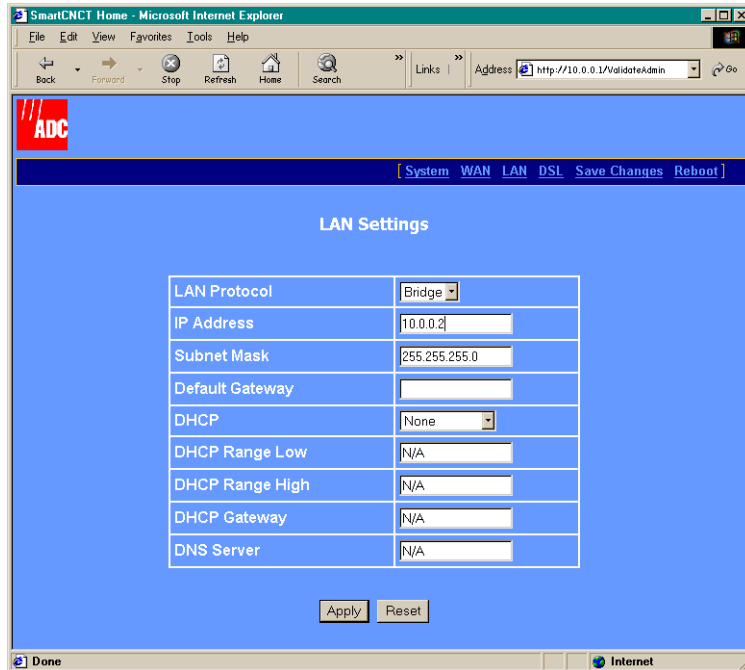
- 2 In the **Exec Mode** box, select **CO** to dedicate the MM701G as the CO modem.
- 3 Click **Apply**.



## Change the LAN IP Address

Any device (such as a PC) connecting to the modem LAN interface loses its connection when the modem LAN IP address is changed. After the IP address is changed, you need to specify this new address to reconnect a device.

- 1 Select **LAN** on the menu bar to access the **LAN Settings** page.

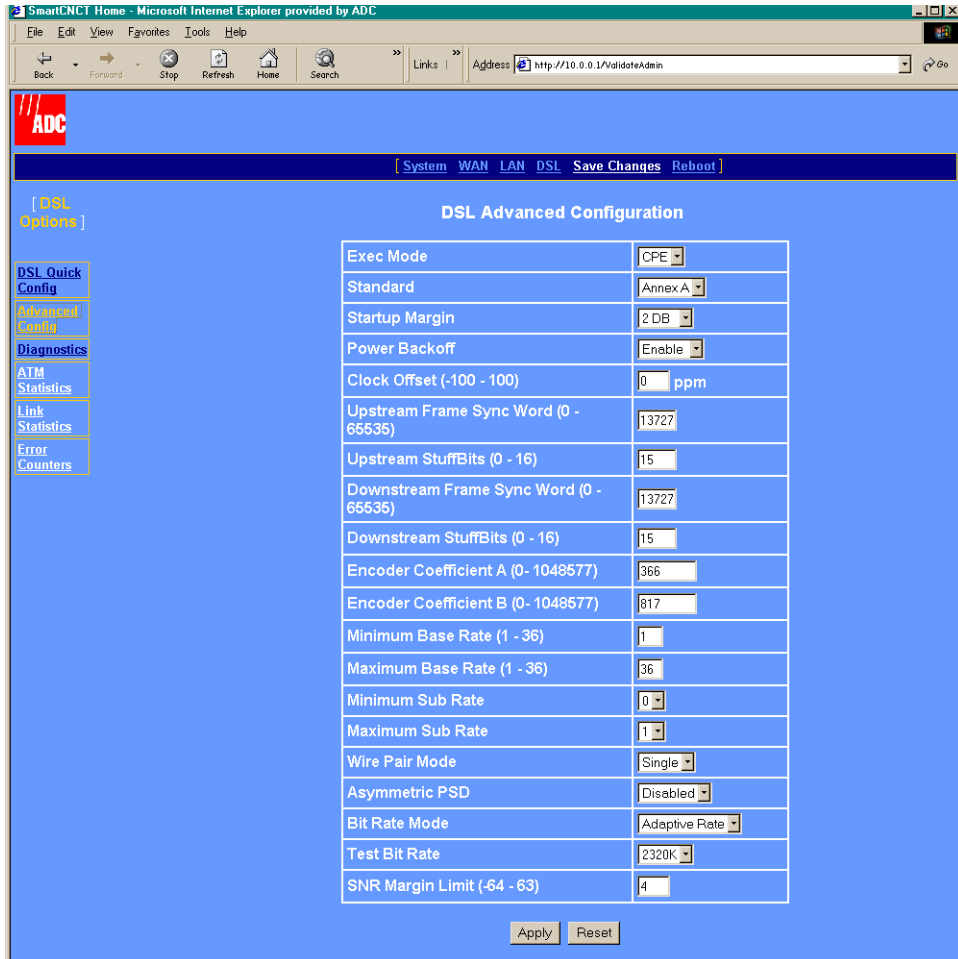


- 2 In the IP address box, enter **10.0.0.2**.
- 3 Click **Apply** to activate the changes. The connection to the Web interface will be lost because the modem now has a new LAN IP address. Specify **http://10.0.0.2** as the URL on your Web browser to reconnect.
- 4 Click **Save Changes** from the menu bar to prevent losing the configuration after resetting the modem.

You are now finished with the Quick Installation. To verify connectivity, refer to [“Verifying Connectivity” on page 76](#)

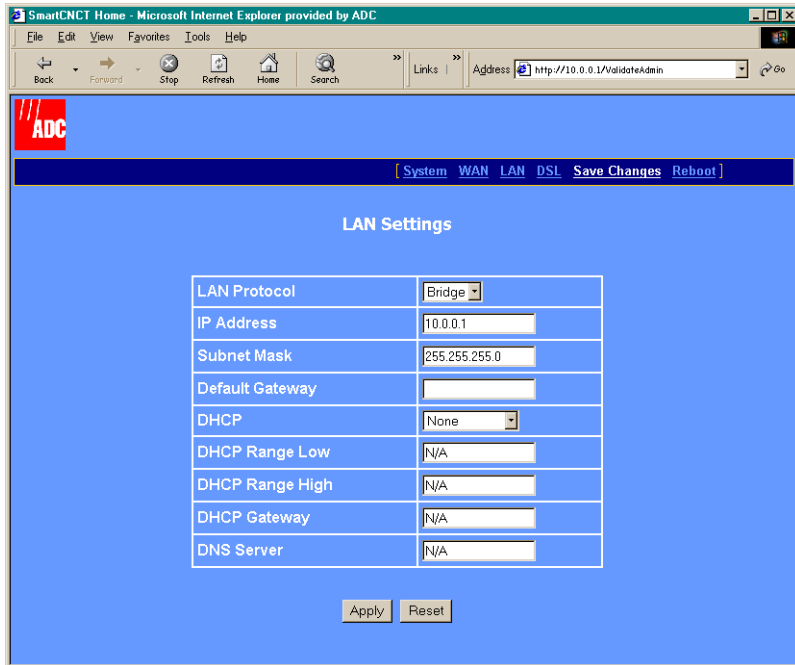
# CONFIGURING THE CPE MODEM

- 1 Select **DSL** on the menu bar then select **DSL Advanced Config** under [DSL Options].



- 2 In the **Exec Mode** box, select **CPE** to configure the MM701G as the CPE modem.
- 3 Click **Apply**.

- 4 Select **LAN** on the menu bar to access the **LAN Settings** page.



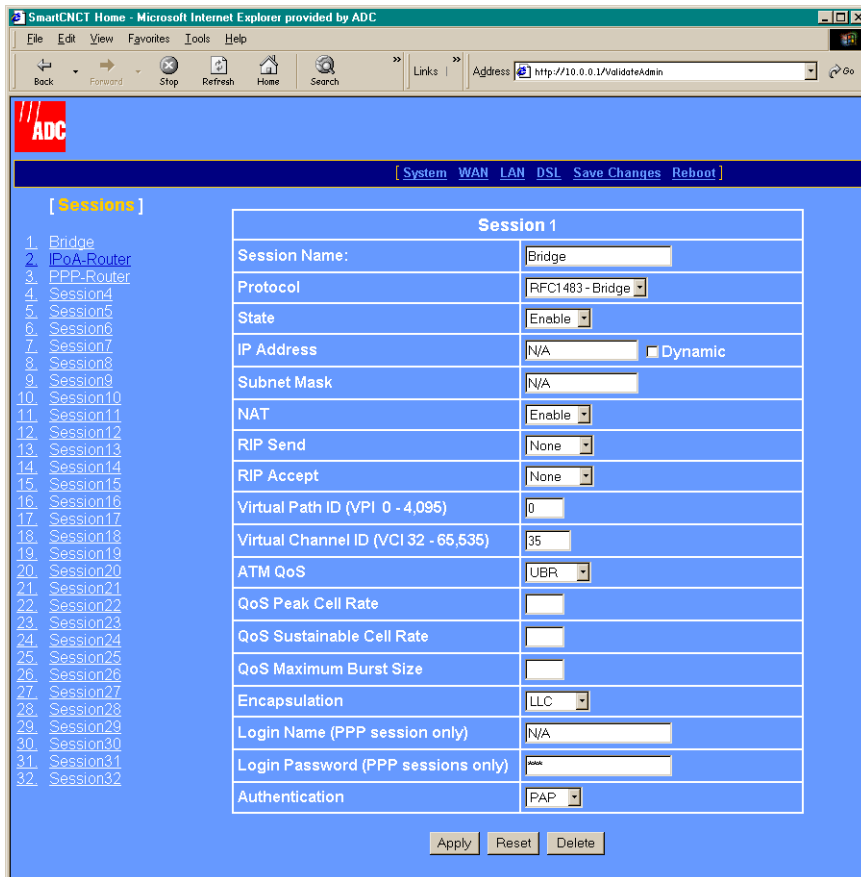
The screenshot shows a web browser window titled "SmartCNC Home - Microsoft Internet Explorer provided by ADC". The address bar contains "http://10.0.0.1/ValidateAdmin". The page has a blue background and a navigation menu with links: [ System WAN LAN DSL Save Changes Reboot ]. The main content area is titled "LAN Settings" and contains a table of configuration fields:

|                 |               |
|-----------------|---------------|
| LAN Protocol    | Bridge        |
| IP Address      | 10.0.0.1      |
| Subnet Mask     | 255.255.255.0 |
| Default Gateway |               |
| DHCP            | None          |
| DHCP Range Low  | N/A           |
| DHCP Range High | N/A           |
| DHCP Gateway    | N/A           |
| DNS Server      | N/A           |

At the bottom of the form are two buttons: "Apply" and "Reset".

- 5 In the **LAN Protocol** box, select **Bridge**.
- 6 In the **IP Address** box, enter an available IP address on your subnet.
- 7 Click **Apply**.

8 Select **WAN** on the menu bar then select **Bridge** under **[Sessions]**.



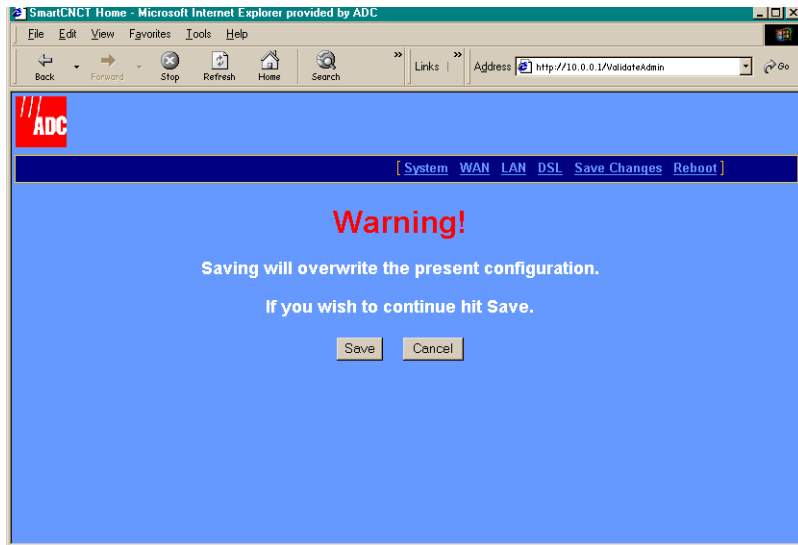
9 In the **Protocol** box, select **RFC 1483 - Bridge**.

10 In the **Virtual Path ID** box, enter the Virtual Path ID. This must match the Virtual Path ID of the CO modem.

11 In the **Virtual Channel ID** box, enter the Virtual Channel ID. This must match the Virtual Channel ID of the CO modem.

12 Click **Apply**.

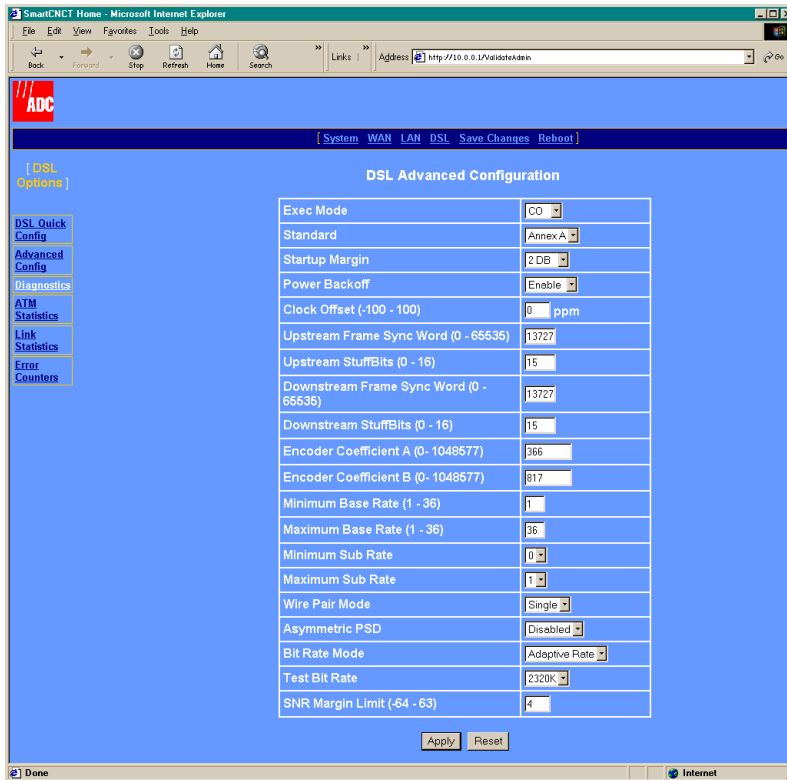
- 13 Select **Save Changes** on the menu bar to access the **Save Changes** page.



- 14 Click **Save** to save the configuration to flash memory.

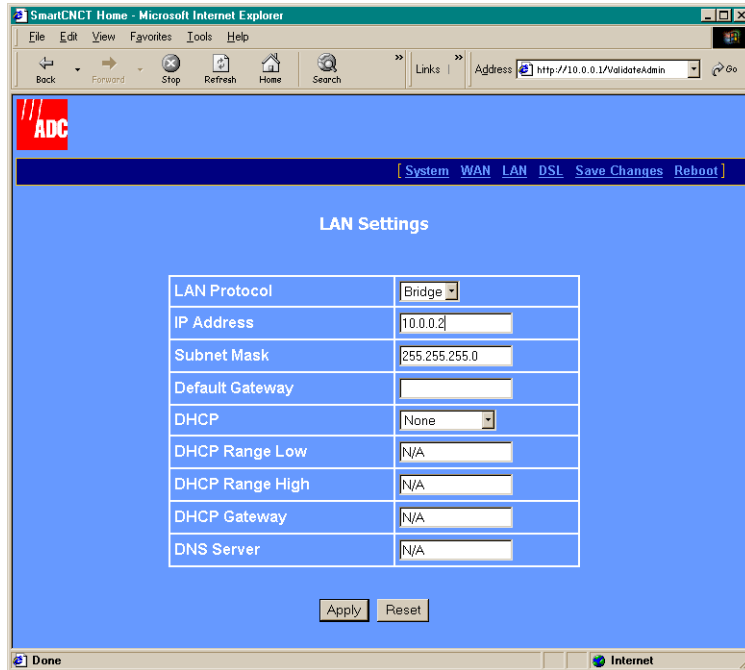
# CONFIGURING THE CO MODEM

- 1 Select **DSL** on the menu bar then select **DSL Advanced Config** under **[DSL Options]**.



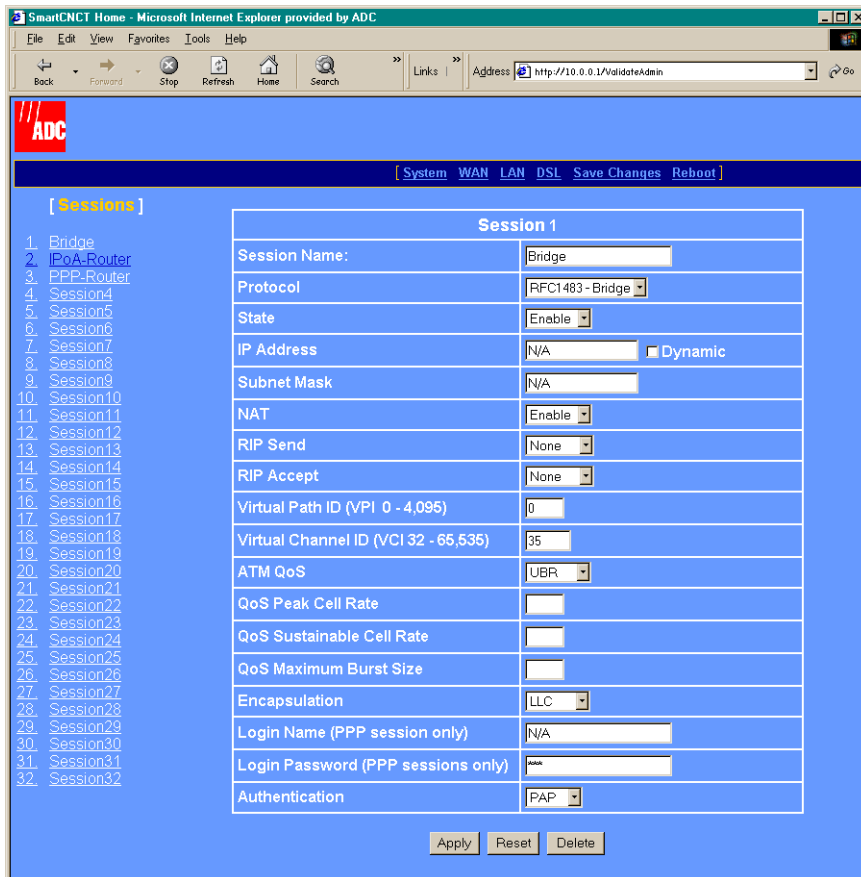
- 2 In the **Exec Mode** box, select **CO** to dedicate the MM701G as the CO modem.
- 3 Click **Apply**.

- 4 Select **LAN** on the menu bar to access the **LAN Settings** page.



- 5 In the **LAN Protocol** box, select **Bridge**.
- 6 In the **IP Address** box, enter an available IP address on your subnet.
- 7 Click **Apply**.

8 Select **WAN** on the menu bar then select **Bridge** under **[Sessions]**.



9 In the **Protocol** box, select **RFC 1483 - Bridge**.

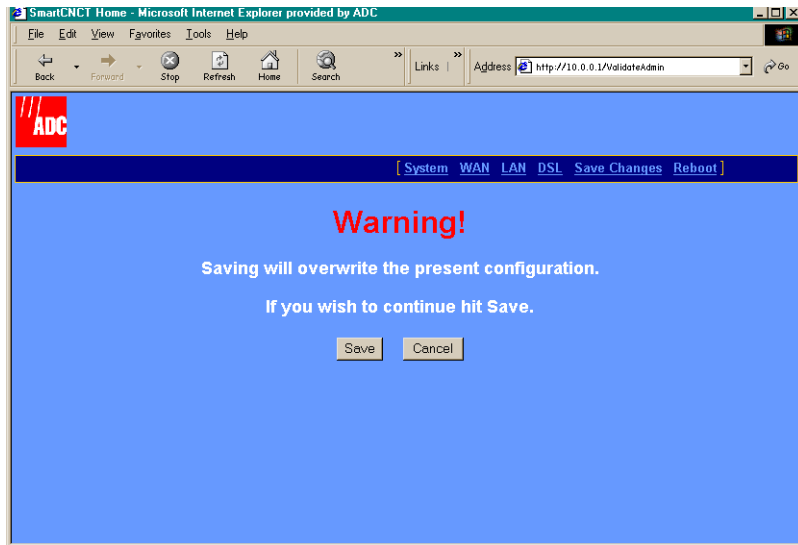
10 In the **Virtual Path ID** box, enter the Virtual Path ID. This must match the Virtual Path ID of the CPE modem.

11 In the **Virtual Channel ID** box, enter the Virtual Channel ID. This must match the Virtual Channel ID of the CPE modem.

12 Click **Apply**.



- 13 Select **Save Changes** on the menu bar to access the **Save Changes** page.



- 14 Click **Save** to save the configuration to flash memory.

## VERIFYING CONNECTIVITY

After you have performed each of the previous configuration changes, verify back-to-back communication by passing traffic over the WAN session. For example, set up a PC on the LAN-side of the CPE modem and another PC on the LAN-side of the CO modem. Then, transfer a file or ping between the two PCs. This generates traffic and tests connectivity.

### View the SYNC LED

On the front panel of one of the MM701Gs, check the status of the SYNC LED. If it is blinking, it is attempting to establish communication with the other modem. If it is on solid green, it has already synchronized its connection with the other modem. See “[Checking LED Indications](#)” on page 6 for LED descriptions.

### View the ATM Statistics

- 1 Select **DSL** on the menu bar then select **ATM Statistics** under **[ATM Statistics]**.

| ATM Statistics   |   |
|------------------|---|
| RX Cell          | 0 |
| TX Cell          | 0 |
| Cell Drop        | 0 |
| Cell Delineation | 0 |
| RX HEC Errors    | 0 |

- 2 View the statistics. If the RX Cell and TX Cell values increment, the two modems have established communication and are passing traffic. If they do not, refresh the page by clicking the **Refresh** button on your Web browser. If the counters still do not increment, verify each modem for the correct configuration parameters.

# SPECIFICATIONS

---



The MM701G is a DSL modem that takes advantage of G.shdsl technology by offering rate-adaptive communication at equal rates going both upstream and downstream. In addition, the MM701G also provides:

- sessions for precise control of security, performance and management of users and resources per session. Allowing Service providers to offer additional services and class of service for Internet access, private ATM networks or connections to application servers like video servers or voice gateways.
- self-installation for non-technical users

For further information, reference the following:

| <b>Section</b>                          | <b>Page</b> |
|-----------------------------------------|-------------|
| <a href="#">Overview</a>                | 78          |
| <a href="#">Data Specifications</a>     | 79          |
| <a href="#">Hardware Specifications</a> | 83          |
| <a href="#">Rate vs. Reach</a>          | 87          |

## OVERVIEW

The MM701G provides:

- fixed-rate or rate-adaptive, symmetric G.shdsl transmission up to 2.3 Mbps
- multiple session types:
  - PPP over ATM (RFC 2364)
  - RFC 1483 bridging over ATM AAL5
  - RFC 1483 routing over ATM AAL5 (IPoA)
- 32 simultaneous sessions of the same or different types
- support for point-to-point LAN extension
- DHCP (client and server) for sending and receiving dynamic IP addresses
- NAT (including NATPT) for IP address and port translation
- TFTP for modem software updates
- RIP versions 1 and 2 for dynamic IP routing information exchange
- multiple management options:
  - serial interface
  - telnet
  - Web interface
  - SNMP agent
- 10Base-T LAN interface with MDI/MDI-X switch
- front panel LEDs for troubleshooting and monitoring LAN and DSL connections
- PAP and CHAP for PPP login name and password authentication
- ATM Quality of Service selection
- statistics for monitoring network traffic
- diagnostic tests to assist technical support personnel

# DATA SPECIFICATIONS

## DSL Standards

- Annex A (991.2)
- Annex B (991.2)

## ATM standards

- ATM Forum UNI Version 3.1 and UNI Version 4.0
- ITU-T Q.2931, Q.2971 signaling
- ITU I.363.5 ATM Adaptation Layer 5
- ITU I.432 Cell Delineation and HEC
- ITU I.361 ATM Cell Format
- Classes of Service: CBR, UBR, VBR-nrt
- Virtual Circuits: 32 for data

## Internetworking Features

- PPP: 1332, 1661, 1638, 1570
- NAT and NAPT: 1631
- DHCP Server & Client: 2131, 2132
- Dynamic IP routing, ARP: 826, RIP: 1058, 1723
- TCP/IP: 1112, 1122, 950, 894, 793, 791, 1812
- BOOTP: 951, 1542
- TFTP: 1350
- IP over ATM: 1577, 1755

## WAN Protocols

- IETF RFC 2364 PPP over AAL5 (VC multiplexing and LLC encapsulation)
- IETF RFC 1483 Multiprotocol encapsulation over AAL5
- IETF RFC 1577 Classical IP over ATM

## Security

- PPP authentication - PAP/CHAP: 1334, 1994
- Web and Telnet password

## Management

- Embedded SNMP agent, Terminal, Telnet with Web based configuration and management tool
- Auto provisioning extensions
- ILMI, OAM F4 and F5 support
- Concise MIB: 1212, MIB-II: 1213, Traps: 1215, Bridge MIB: 1493
- SNMP MIB: 1471, 1472, 1473, 1474
- SNMP: 1157
- Open DSL
- DSL Forum Auto-Configuration
- Remote Configuration

## Software Upgrade

- TFTP download into built-in flash memory
- Remote download (DSLAM support required)

## Encapsulation

When you activate RFC 1483 system mode, you can select WAN encapsulation as VC multiplexing for some sessions and LLC encapsulation for other sessions.

| <b>PPP</b>                    |                                                                                                                                                                                                                                          |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Authentication (PAP/CHAP)     | Provides authentication of PPP sessions for security through Password and Challenge-Handshake Authentication Protocols (RFC 1994).                                                                                                       |
| Network Address Translation   | Network Address Translation (NAT) maps LAN side private IP address to the public IP address assigned to the 32 virtual channels (RFC 1631). You can map to two private addresses to each of the 32 sessions for a total of 64 addresses. |
| <b>Routing</b>                |                                                                                                                                                                                                                                          |
| Routing Protocol              | Supports RFC 1724 Routing Information Protocol (RIP and RIP Version 2).                                                                                                                                                                  |
| Encapsulation                 | Supports Logical Link Control (LLC) or VC-based multiplexing (RFC 1483).                                                                                                                                                                 |
| Static Routes                 | Supports up to 32 static routes.                                                                                                                                                                                                         |
| Address Resolution            | Supports Address Resolution Protocol (ARP) over the LAN port (RFC 826).                                                                                                                                                                  |
| <b>Bridging</b>               |                                                                                                                                                                                                                                          |
| Bridging and Address Learning | Implements a transparent learning bridge with a bridging table of 1024 entries.                                                                                                                                                          |
| Encapsulation                 | Supports Logical Link Control (LLC) or VC-based multiplexing (RFC 1483).                                                                                                                                                                 |
| Spanning Tree                 | Provides Spanning Tree support per IEEE 802.1d.                                                                                                                                                                                          |

## RFCs

- RFC 1483 Multiprotocol Encapsulation over ATM (Bridging/Routing)
- RFC 2364 PPP Encapsulation over ATM
- RFC 1994 for PAP/CHAP Authentication
- RFC 1631 IP Network Address Translator (for NAT)
- RFC 1350 for TFTP client
- RFC 2131 and RFC 2132 for DHCP server and relay protocols (supported only in RFC 1483 Bridging mode) and extensions, respectively

## MIBs

- Bridge MIB - 1493
- SNMP MIBs - 1471, 1472, 1473, 1474
- MIB 1213 - MIB II
- MIB 1215 - Trap

## Default Session Parameter Values

| Session Parameter                    | Bridge           | IPoA Router      | PPP-Router    |
|--------------------------------------|------------------|------------------|---------------|
| Protocol                             | RFC1483 - Bridge | RFC1483 - Router | PPPoA         |
| State                                | Enable           | Enable           | Enable        |
| IP Address                           | N/A              | 10.0.0.1         | N/A (Dynamic) |
| Subnet Mask                          | N/A              | 255.255.255.0    | N/A (Dynamic) |
| NAT                                  | Enable           | Disable          | Disable       |
| RIP Send                             | None             | RIP I & II       | RIP I & II    |
| RIP Accept                           | None             | RIP I & II       | RIP I & II    |
| Virtual Path ID (VPI: 0 - 4095)      | 0                | 0                | 0             |
| Virtual Channel ID (VCI: 32 - 65536) | 105              | 106              | 110           |
| ATM QoS                              | UBR              | UBR              | UBR           |
| QoS Peak Cell Rate (PCR)             | N/A              | N/A              | N/A           |
| QoS Sustainable Cell Rate (SCR)      | N/A              | N/A              | N/A           |
| QoS Maximum Burst Size (MBS)         | N/A              | N/A              | N/A           |
| Encapsulation                        | LLC              | LLC              | LLC           |
| Login Name                           | N/A              | N/A              | admin         |
| Login Password                       | ***              | ***              | password      |
| Authentication                       | PAP              | PAP              | CHAP          |



# HARDWARE SPECIFICATIONS

## LED

- Power
- Ethernet: Link, Tx, Rx, Collision
- DSL: Sync, Tx, Rx, Margin

## Connectors

- DSL Interface: RJ-11
- 10Base-T: RJ-45
- Console Port: RJ-45 (serial connection to RS-232 for local configuration)

## LAN Interface

- 10Base-T (IEEE 802.3i)
- Connector: RJ-45 with MDI/MDI-X switch

## WAN Interface

---

### SHDSL (Symmetrical High-Speed Digital Subscriber Line)

---

|                                   |           |
|-----------------------------------|-----------|
| Maximum transmission rate:        |           |
| Downstream                        | 2320 kbps |
| Upstream                          | 2320kbps  |
| Minimum transmission rate to sync | 192 kbps  |
| Connector                         | RJ-11     |

---

### ATM (Asynchronous Transfer Mode)

---

|                          |                                                                                                                                                                                                                                                               |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ATM Adaptation Layer     | AAL5 (ITU I.363.5)—Supports encapsulation and de-encapsulation of AAL5 Protocol Data Units (PDUs) for convergence. Segmentation and Reassembly (SAR) layer segments and reassembles AAL5 PDUs into ATM cells that are 48 byte SAR-PDUs.                       |
| ATM Layer                | Attaches or strips the 5-byte header to the 48-byte SAR-PDU. Performance is a maximum line rate of 17,812 cells per second downstream and 2,189 cells per second upstream.                                                                                    |
| Cell Format              | Format complies with ITU I.361 ATM cell format. Cell delineation complies with ITU I.432 Cell Delineation and HEC. Cells are fixed length (53 bytes), including 5 bytes of header and 48 bytes of payload. Included in the header are the VPI and VCI number. |
| Virtual Circuit type     | Permanent Virtual Circuit (PVC) per ATM forum UNI Version 3.1.                                                                                                                                                                                                |
| Maximum Virtual Circuits | 32 virtual circuits that can simultaneously connect to service providers for sessions encapsulated either as PPP or RFC 1483 Bridging/Routing.                                                                                                                |

---

## Connector Pinouts

The following sections provide the pinout information for the various modem connectors.

### DSL Port (RJ-11)

The following table shows the signal on each pin of the DSL port. The connector for this interface is an RJ-11. See “[Connecting the Cables](#)” on page 5 for the location of this port.

| Pin | Signal        |
|-----|---------------|
| 1   | Not used      |
| 2   | No connection |
| 3   | Ring          |
| 4   | Tip           |
| 5   | No connection |
| 6   | Not used      |

### 10Base-T Port (RJ-45)

The following table shows the signal on each pin of the 10Base-T port connector when the switch is in either the MDI or the MDI-X position. The connector for this interface is an RJ-45. See “[Connecting the Cables](#)” on page 5 for the location of this port.

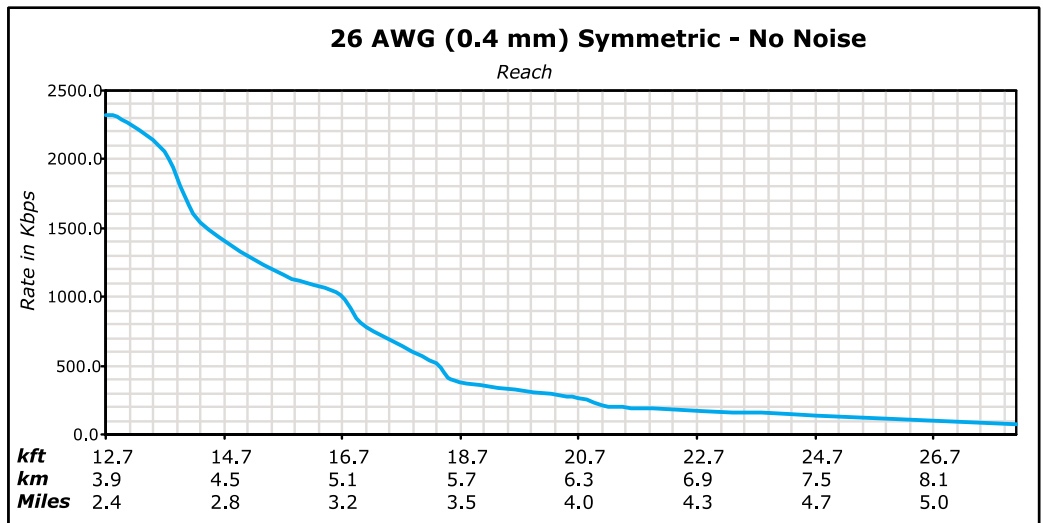
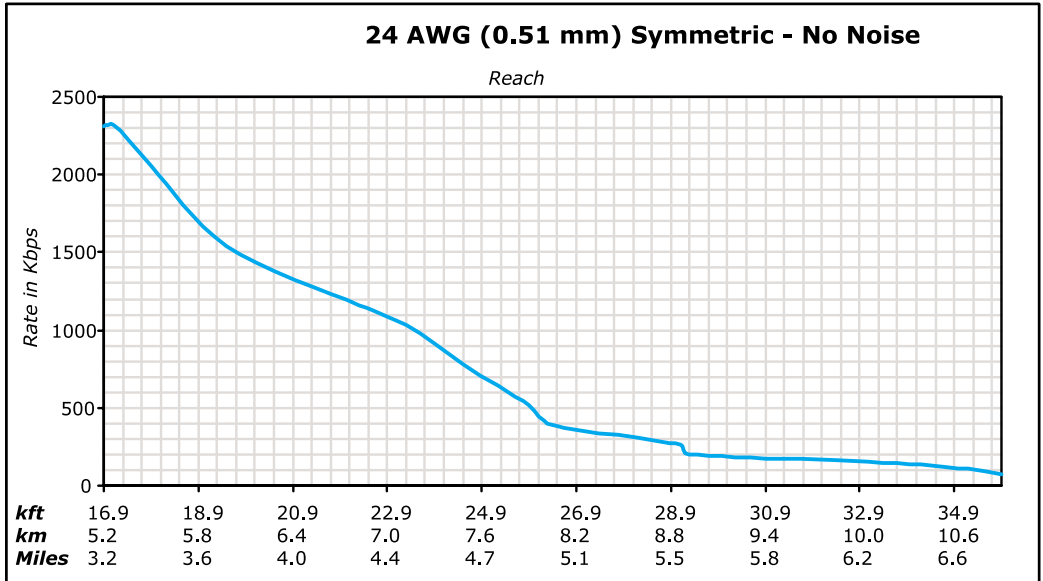
| MDI | MDI-X | Signal   | Description       |
|-----|-------|----------|-------------------|
| 1   | 3     | TX+      | Transmit Data (+) |
| 2   | 6     | TX-      | Transmit Data (-) |
| 3   | 1     | RD+      | Receive Data (+)  |
| 4   | 4     | Not used | Not used          |
| 5   | 5     | Not used | Not used          |
| 6   | 2     | RD-      | Receive Data (-)  |
| 7   | 7     | Not used | Not used          |
| 8   | 8     | Not used | Not used          |

## Console Port (RJ-45)

The following table gives the signal designations and pin numbers for each end of the RJ-45 to RS-232 cable that is used between the modem Console port (RJ-45) and the PC Serial port (DB-9).

| PC RS-232 Serial Port<br>(DB-9) | Modem<br>Console<br>(RJ-45) | Signal | Description   |
|---------------------------------|-----------------------------|--------|---------------|
|                                 | 1                           | RTS    | Ground        |
|                                 | 2                           | DTR    | Ground        |
| 3                               | 3                           | TxD    | Transmit Data |
|                                 | 4                           | GND    | Ground        |
| 5                               | 5                           | GND    | Ground        |
| 2                               | 6                           | RxD    | Receive Data  |
|                                 | 7                           | DSR    | Ground        |
|                                 | 8                           | CTS    | Ground        |

# RATE VS. REACH





# TECHNICAL ASSISTANCE AND RETURNS

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This chapter describes how to contact ADC for technical support.

## WORLD WIDE WEB

Avidia product information can be found at <http://www.adc.com> using any Web browser.

## KNOWLEDGE BASE

The ADC Knowledge Base can help you locate answers to frequently asked questions on a variety of topics, including:

- troubleshooting
- installation
- configuration
- upgrades

The Knowledge Base can be found at: [http://www.adc.com/Knowledge\\_Base/index.jsp](http://www.adc.com/Knowledge_Base/index.jsp) using any Web browser.

## TECHNICAL SUPPORT

Technical support is available 24 hours a day, 7 days a week by contacting the ADC Technical Assistance Center (TAC).

- Telephone: 800.638.0031  
714.730.3222
- Fax: 714.730.2400
- Email [wsd\\_support@adc.com](mailto:wsd_support@adc.com)

A Customer Service Engineer answers technical assistance calls Monday through Friday between 7:30 AM and 5:30 PM, Pacific Time, excluding holidays. At all other times, an on-duty Customer Service Engineer returns technical assistance calls within 30 minutes.

Refer to the ADC web site (see above) for specific warranty information.

## RETURNS

To return equipment to ADC:

- 1 Locate the purchase order number under which the equipment was purchased. You will need to provide this number to ADC Customer Service to obtain a return authorization.
- 2 Call ADC Customer Service to ask for a Return Material Authorization (RMA) number and instructions before returning products. Use the telephone number, fax number, or email address listed below:
  - Telephone: 800.366.3891 ext. 63748 or 952.946.3748  
The 800 line is toll-free in the U.S. and Canada.
  - Fax: 952.946.3237
  - Email Address: [repair&return@adc.com](mailto:repair&return@adc.com)
- 3 Be prepared to provide the following information:
  - Company name, address, telephone number, and the name of a person Customer Service can contact regarding this equipment.
  - A description of the equipment as well as the number of units that you are returning. Be sure to include the model and part number of each unit.
  - The shipping address to which Customer Service should return the repaired equipment.
  - The reason for the return.



# GLOSSARY

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|                |                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10Base-T       | The Institute of Electrical and Electronic Engineers (IEEE) 802.3 specification for Ethernet over thin coaxial cable.                                                                                                                                                                                                                                                                                                          |
| AAL2           | ATM Adaptation Layer 2. Used for compressed voice and video that is intolerant of delay. This layer is used by G.shdsl xDSL technology.                                                                                                                                                                                                                                                                                        |
| AAL5           | ATM Adaptation Layer 5. AAL5 has been adopted by the ATM Forum from a Class of Service called High Speed Data transfer. It typically supports all types of data traffic. Originally designed to support TCP/IP.                                                                                                                                                                                                                |
| ATM            | Asynchronous Transfer Mode is a high bandwidth, low delay, connection-oriented, packet-like switching and multiplexing technique that uses 53-byte fixed-size cells to transmit voice, video and data over a network. ATM layers define how cells are formatted and provides the transport of the fixed length cells between the modem and the service provider (or endpoints of the virtual connection).                      |
| attenuation    | The dissipation of the power of a transmitted signal as it travels over copper wire, measured in decibels (dB).                                                                                                                                                                                                                                                                                                                |
| authentication | Security feature offered through PAP and CHAP with PPP sessions.                                                                                                                                                                                                                                                                                                                                                               |
| BER            | Bit Error Rate is a measure of transmission quality. The ratio of error bits to the total number of bits transmitted.                                                                                                                                                                                                                                                                                                          |
| bps            | bit-per-second is the number of bits transferred during each second of data transmission.                                                                                                                                                                                                                                                                                                                                      |
| CBR            | Constant Bit Rate is a Service Class for the modem. It provides constant bit rate data with a timing relationship between the source and the destination. Also, a traffic class that carries a guaranteed constant bandwidth. Best suited for applications that require fixed bandwidth, such as uncompressed voice, video and circuit emulation. CBR is a Quality of Service class defined by the ATM Forum for ATM networks. |
| cell           | A fixed-length packet. Also, the unit of data transmission used in ATM. Each ATM cell contains a fixed-size frame (53 bytes) consisting of a five-byte header and a 48-byte payload.                                                                                                                                                                                                                                           |

---

|                    |                                                                                                                                                                                                                                                      |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| community string   | A text string required for an SNMP trap to be received by a trap receiver(s). Also, a text string that identifies an SNMP community and is associated with specific access rights (read-only or read/write).                                         |
| CRC                | Cyclic Redundancy Check is a method used to verify the accuracy of data transmission.                                                                                                                                                                |
| downstream traffic | Communications from a service provider to a user.                                                                                                                                                                                                    |
| encapsulation      | The inclusion of data in a protocol header prior to transmission, which enables successful data transmission between different protocol networks.                                                                                                    |
| ES                 | Errored Seconds is the seconds during which errors occur that prevent the payload from being corrected.                                                                                                                                              |
| Ethernet           | A protocol used for LAN traffic, which has a transfer rate of 10 or 100 Mbps.                                                                                                                                                                        |
| flash memory       | Non-volatile memory that can be erased and reprogrammed.                                                                                                                                                                                             |
| gateway            | A device (generally a router) that provides translation services to allow communication between two dissimilar networks.                                                                                                                             |
| IP                 | Internet Protocol is a TCP/IP protocol that controls packet transmission.                                                                                                                                                                            |
| IP address         | A 32-bit address used in IP routing. The address consists of four octets separated by decimals. The octets comprise a network section, a subnet section (optional) and a host section.                                                               |
| LAN                | Local Area Network is a physically connected group of devices between which data transmission occurs at high speeds over relatively short distances.                                                                                                 |
| LLC                | Logical Link Control is an encapsulation protocol for data that you transmit from the modem over the WAN in 1483 Bridging/Routing mode.                                                                                                              |
| LOF                | Loss Of Frame is an error indicating that the receiving equipment has lost a frame.                                                                                                                                                                  |
| LOS                | Loss Of Signal is an error indicating that the receiving equipment has lost the signal.                                                                                                                                                              |
| MAC                | Media Access Control is a physical address associated with a device such as a NIC. For modem configuration, the MAC is used to map inbound traffic (from a remote IP address) to an internal (LAN) IP address. Used with 1483 Bridging/Routing Mode. |
| margin             | The noise margin in decibels that the modem must achieve with a BER of $10^{-7}$ or better to successfully complete initialization.                                                                                                                  |

---

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MIB              | Management Information Base is a set of variables that define the configuration and status parameters for network management. Network management stations can retrieve information from and write information to an MIB. The Internet Engineering Task Force (IETF) specifies standard MIBS for certain types of devices, ensuring any NMS can manage the devices. Vendors can specify proprietary MIBs for their devices to fit specific needs.                                                                                                                                                            |
| NAPT             | Network Address and Port Translation provides the means to map private IP addresses and TCP/UDP ports to the public IP addresses (proxy addresses) and TCP/UDP ports that are set up for the PPP sessions. Used with PPP Mode.                                                                                                                                                                                                                                                                                                                                                                              |
| NVRAM            | Non-Volatile Random Access Memory is a medium for storing system configuration information, so the information is not lost when the system is reset.                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| octet            | A TCP/IP term indicating eight bits.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| PAP/CHAP         | Password Authentication Protocol and Challenge Handshake Authentication Protocol are two ways to authenticate PPP sessions. With PAP, the modem sends authentication requests to the service provider and authentication occurs only once during the life of the link.<br><br>In CHAP, the service provider returns an authentication challenge to the modem during authentication. CHAP can be renegotiated during the life of the link. Also, both the modem and the service provider must support clear text versions of the password. The CHAP host field must be the same on both ends of the session. |
| PDU              | Protocol Data Unit is data as it appears at the interface between a particular sublayer and the sublayer immediately below.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| POTS             | Plain Old Telephone Service.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| PPP              | Point-to-Point Protocol exists between the hardware layer and the network-layer interface protocols. It is a widely used protocol for establishing connections on the Internet. PPP provides the set up and release of connections for each session. PAP/CHAP provide the authentication for the PPP sessions.                                                                                                                                                                                                                                                                                              |
| proxy IP address | The proxy IP address is the WAN IP address for one of the 32 sessions. The proxy IP address is used to enter static NAT entries. See IP address.                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| PVC              | Permanent Virtual Circuit is a logical connection comprised of a predefined static route across a packet-switched network that is always in place and always available.                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| QoS              | Quality of Service is the configured traffic parameters that are assigned to a virtual circuit, which specifies how quickly and how accurately data is transferred from the sender to the receiver.                                                                                                                                                                                                                                                                                                                                                                                                         |
| RFC              | Request For Comment is a series of notes that contain surveys, measurements, ideas, techniques, and observations, as well as proposed and accepted TCP/IP protocol standards. RFCs are available on the Internet.                                                                                                                                                                                                                                                                                                                                                                                           |

---

|                |                                                                                                                                                                                                                                                                                                                                                                           |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RIP            | Routing Information Protocol allows routers to update the routing tables automatically (for example with information such as how many hops between destinations). The version of RIP you select for the session must match the version supported by the service provider. Versions RIP1 and RIP-1 compatible are used for broadcast. Version RIP 2 is used for multicast. |
| SEF            | Severely Errored Frames is the incoming signal has at least four consecutive errored framing patterns.                                                                                                                                                                                                                                                                    |
| SES            | Severely Errored Seconds is the seconds during which more than 2,500 bipolar errors are detected on the line.                                                                                                                                                                                                                                                             |
| session        | The time during which two computers maintain a communication connection. An example is a connection configured between the MM550 Integrated Access Device and the service provider.                                                                                                                                                                                       |
| SNMP           | Simple Network Management Protocol is a protocol that specifies how to send information between a NMS and managed devices on a network. The managed devices run a program called an agent. The agent interprets SNMP request and responds to them. SNMP is used to set device configurations, read device configurations or read the device status.                       |
| Spanning Tree  | A bridging protocol that detects and prevents loops from occurring in a system containing multiple bridges.                                                                                                                                                                                                                                                               |
| subnet mask    | A type of IP address that allows a site to use a single IP address for multiple physical networks.                                                                                                                                                                                                                                                                        |
| TCP            | Transmission Control Protocol is a transport protocol used to map inbound traffic (from a remote IP address) to an internal (LAN) IP address. Establishes connection with remote user before data transmission.                                                                                                                                                           |
| TCP/IP         | Transmission Control Protocol/Internet Protocol is a protocol used for communications between computers over networks and the internet.                                                                                                                                                                                                                                   |
| TFTP           | Trivial File Transfer Protocol is a protocol used to download card images or other files from an external TFTP server to the NVRAM of any installed cards, or to upload files from an installed card to an external TFTP server.                                                                                                                                          |
| trap receivers | PCs configured to receive SNMP traps (messages).                                                                                                                                                                                                                                                                                                                          |
| traps          | Autonomous, interrupt-driven, SNMP messages sent from a managed node to a network management station to indicate that an event has occurred.                                                                                                                                                                                                                              |
| UAS            | UnAvailable Seconds is the number of seconds during which the line is unavailable.                                                                                                                                                                                                                                                                                        |
| UBR            | Unspecified Bit Rate is an ATM traffic type used for LAN traffic. When network congestion occurs, the data is stored in a buffer until it can be sent.                                                                                                                                                                                                                    |

|                  |                                                                                                                                                                                                                |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UDP              | User Datagram Protocol is a transport protocol used to map inbound traffic (from a remote IP address) to an internal (LAN) IP address. Uses a protocol port number for the destination at the remote location. |
| upstream traffic | Communications from a user to a service provider.                                                                                                                                                              |
| VCI              | Virtual Channel Identifier is a 16-bit field addressing identifier in the header of an ATM cell used to route cell traffic. It identifies a particular VC link for a given VP.                                 |
| VCMUX            | Virtual Channel Multiplexer-based encapsulation used for networks with large numbers of virtual channels making it practical to carry a single protocol per virtual channel.                                   |
| VC               | A Virtual Channel is a logical connection in the ATM network over which ATM cells are transmitted.                                                                                                             |
| VPI              | Virtual Path Identifier is an 8-bit field addressing identifier in the header of an ATM cell that is used to route cell traffic. It identifies a particular VP link.                                           |
| VP               | A Virtual Path is a group of VCs carried between two points. The VP provides a means of bundling traffic traveling in the same direction. VPs are defined by a unique VPI value.                               |
| WAN              | Wide Area Network is a network consisting of nodes located across a large geographical area. Also, the connection between a service provider and MM701G Modem.                                                 |

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